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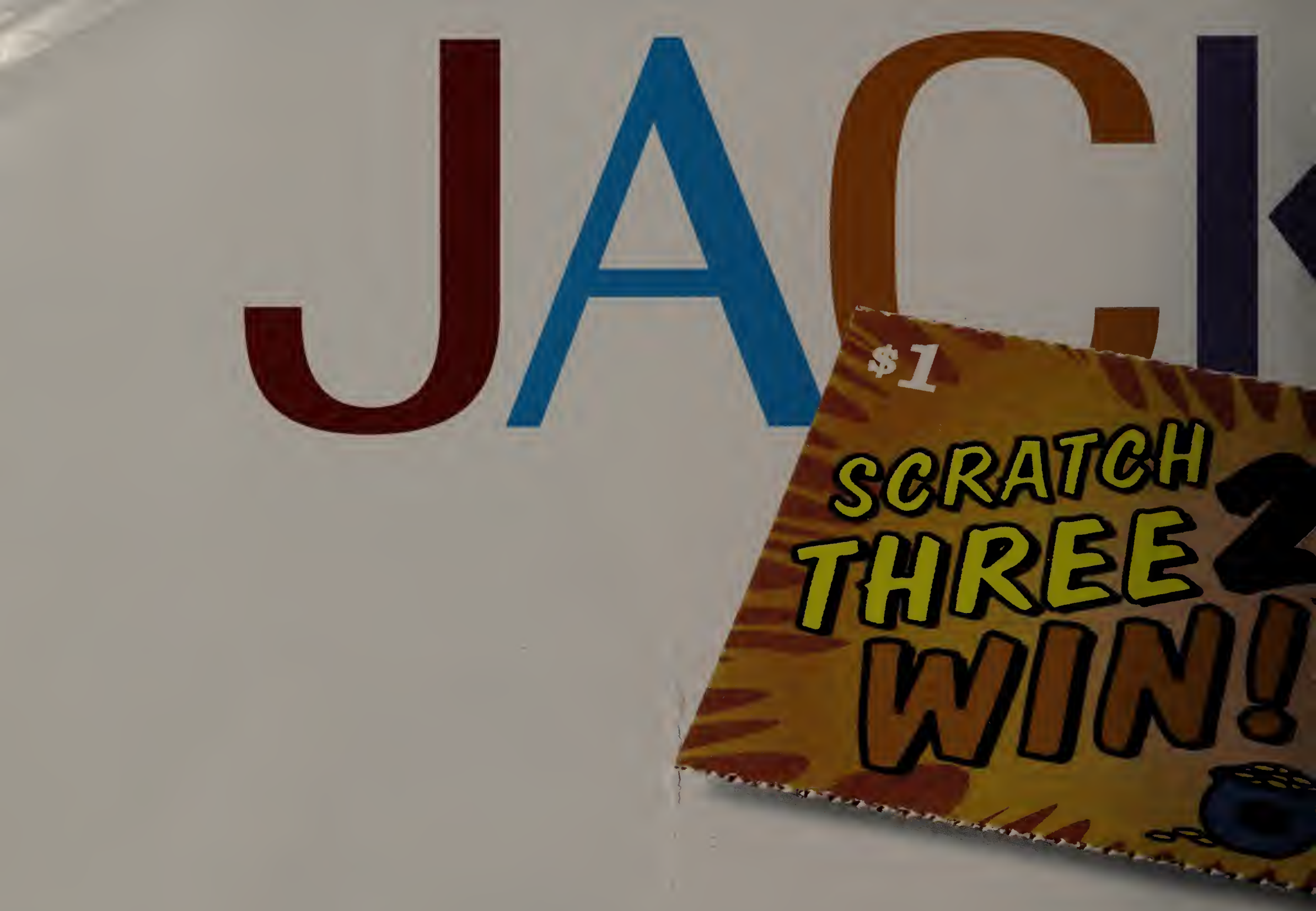
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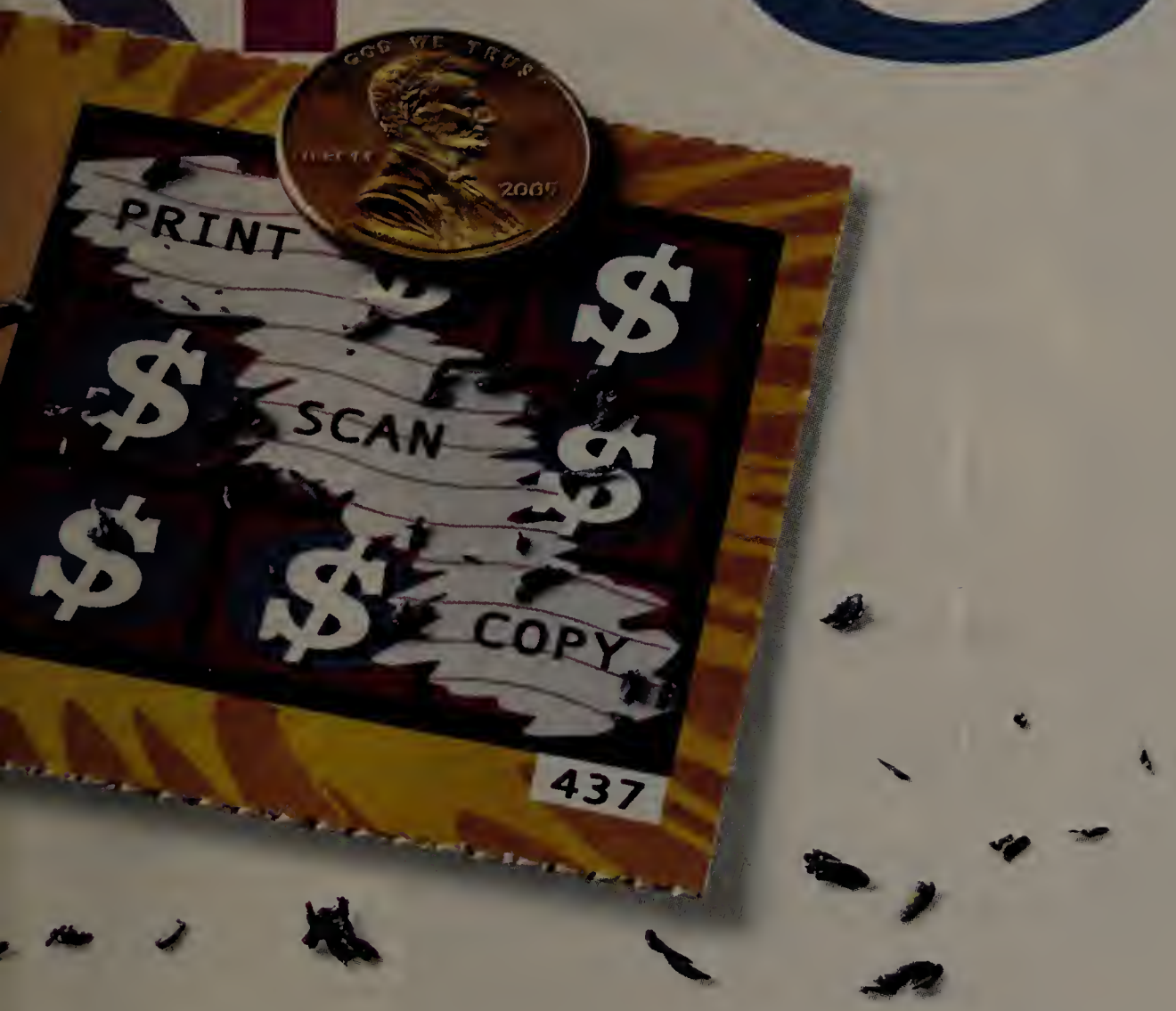

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News

7 IT Road Map event highlights top technologies for the year ahead.

7 ICANN test bed for internationalized domain names hailed, called late.

10 Novell preps users for **Linux.**

10 EMC readying SMB arrays.

12 Microsoft plays with shipping date for Vista.

14 Telecom heavies attempt to clear the air on **'Net neutrality.**

14 Regulatory relief for **Verizon** could mean price hikes down the road.

17 Higher education embraces **shared network services.**

Net Infrastructure

19 Force10 touts 10G Ethernet switch.
19 Mike Rothman: My beliefs about security.

Enterprise Computing

21 Stratus extends fault-tolerance reach.
21 HP design shift gives its AMD servers more speed.

Application Services

23 Software cleanses sensitive documents.
23 Scott Bradner: IETF: Not a teenager anymore.

Service Providers

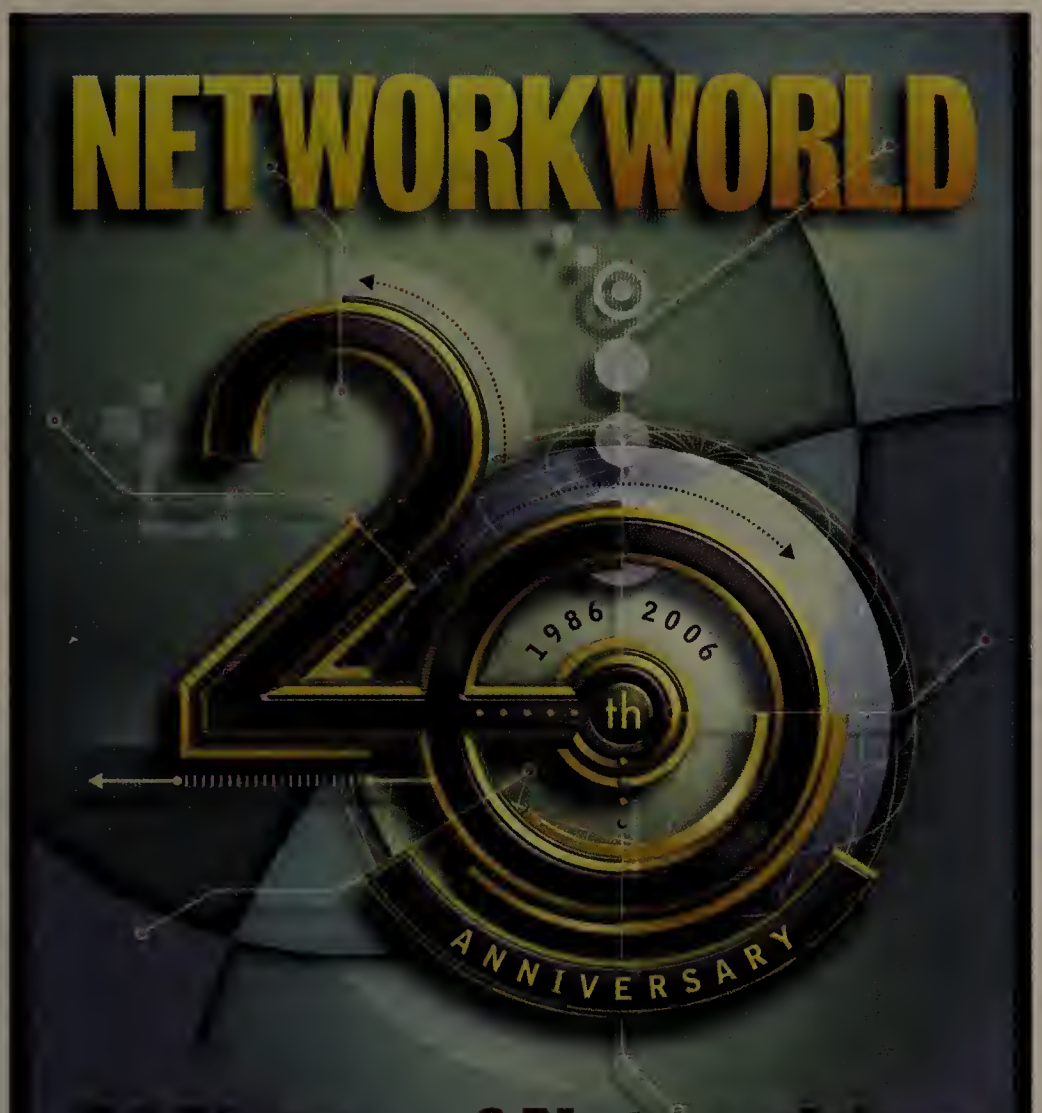
25 Johna Till Johnson: Why Internet metaphors matter.
25 Usage-based pricing is a catchy tune for one company.

Technology Update

27 SyncML links communications devices.
27 Steve Blass: Ask Dr. Internet.
28 Mark Gibbs: OQO outstanding and disappointing.
28 Keith Shaw: Cool tools, gizmos and other neat stuff.

Opinions

66 BackSpin: Laws in France kick Apple's pants.
66 Net Buzz: Sprint recruits ambassadors of ill will.



20 Years of Networking

20-20-20: A compilation of change in three acts 31
Then and now: $20 buys you . . . 38
Router man 39
A special nod of thanks 44
New pay, new responsibilities 46
20 years in networking 48
Giga flops 50
Are you a net know-it-all? 52
Future shock 54
Advice for the next gen 58

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Vista notes from all over
Our countdown to Vista page will keep you up to date on Microsoft's new operating system — with the latest news and comments from around the 'Net. **DocFinder: 2728**

ITVideo: Mark your gear invisibly
If your stuff is stolen and recovered by the police, how will you know it's yours? Editor Keith Shaw shows you a very tiny solution: DataDots. **DocFinder: 2729**

ITVideo: Securing the database
With all the news of stolen credit card and identity data from large corporations, database security is more important than ever. On *Network World*'s Hot Seat, Ted Julian of Application Security discusses his company's strategy for keeping your data secure. **DocFinder: 2730**

All-Star call for entries
Get recognition for your cool network project. Enter our 2006 Enterprise All-Star Award competition. Go online for more information and a nomination form. **DocFinder: 2436**

Online help and advice

Problems connecting to a specific Web site
Help desk guru Ron Nutter helps a user figure out why he can't get to it. **DocFinder: 2731**

NetWare
Columnist James Gaskin says he misses NetWare, but discusses why it's time to bail on Novell. **DocFinder: 2732**

What would happen if we all paid for e-mail?
Michael Osterman, of Osterman Research, examines the potential ramifications of plans to fight spam by charging a small fee for each message. **DocFinder: 2733**

Application traffic management and you
Senior Editor Denise Dubie looks at how management tools can help you regain control of your network. **DocFinder: 2734**

New: SMB ask the experts
Our new forum lets you get help on your small to midsize business problems — and share tips with other users. **DocFinder: 2735**

Seminars and events

An April technology tour event from *Network World*
For an up-close and personal look at new solutions and best practices for developing wireless LAN meshes and metro-scale deployments — merging 1xEV-DO and HSDPA cellular broadband — and deploying mobile applications for strategic advantage, attend Wireless LANs & Enterprise Mobility: Know No Limits. **DocFinder: 2736**

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NEWS

Native language domains threaten 'Net

ICANN test bed for internationalized domain names hailed, called long past due.

BY CAROLYN DUFFY MARSAN

The Internet Corporation for Assigned Names and Numbers has announced plans to run a test bed for internationalized domain names this summer. But experts say ICANN's test bed may be too late for the domain name industry, which is under intense pressure from Internet users outside the United States to support native language domain names.

Countries such as China, Egypt, Iran and Saudi Arabia are forging ahead with IDNs without ICANN's approval. These countries are no longer willing to wait for ICANN to develop a standard approach for inserting IDN records into the root zone of the DNS.

IDNs could have a major impact on multinational corporations, which are increasingly dependent on the Internet to market products overseas. If ICANN is not successful at developing a standard approach for IDNs, corporations will have no guarantee that the native language domains they buy will resolve to content they control.

"There is nothing to say that Kraft.com in China has to have anything to do with Kraft Foods or Kraft.com in India," says Rodney Jaffe, chairman and CTO of UltraDNS and a member of ICANN's Security and Stability Advisory Committee. "Global multinationals are totally unaware of this possibility."

The issue of IDNs threatens to undermine the Internet itself, which is based on a shared namespace that originates in a single root. Experts fear that ICANN's delay in supporting IDNs could result in a permanent splintering of the DNS, which would create many small networks run by individual countries rather than a single, global Internet.

IDNs are expected to be among the hottest topics at ICANN's next meeting, which occurs this week in Wellington, New Zealand (meetings are held every four months). On Tuesday, members of the Security and Stability Advisory Committee are scheduled to present a report detailing the status of IDNs and the threat of alternative roots.

"ICANN's lack of action with IDNs has created a vacuum that is the prime enabler of countries that are interested in running alternative roots," Jaffe says. "Instead of being 12 or 15 countries that talk about running their own root infrastructure, there will probably be 40 to 60 countries talking about it at the New Zealand meeting."

IDNs are an issue because the DNS supports English language ASCII characters while Internet users in other countries want to use domain names with native language character sets and scripts. In 2003 the IETF developed a standard for resolving non-English language characters in the DNS infrastructure, but ICANN has been slow to support that standard.

In its test bed announced March 14, ICANN will include two approaches to inserting IDN records into the root zone of the DNS. One is the IETF standard, which maps non-ASCII characters into ASCII equivalents. The alternative inserts internationalized labels in the root zone.

"We're thrilled to see the ICANN test," says Ram Mohan, vice president of business operations and CTO of Afilias, which operates the .info and .org registries. "It's very good but it's long overdue. . . . If ICANN doesn't move forward, the world isn't waiting."

Internet registrars have been selling IDNs under guidelines that ICANN announced in 2003. IDNs are available for country codes including China, Japan and Taiwan, as well as for generic top-level domains such as .info and .org. Users must download special browser plug-ins to reach these IDNs.

The number of IDNs sold so far is small compared with ASCII-based domain names. For example, Afilias manages 25,000 IDNs compared with an overall portfolio of 7 million domain names.

The domain name industry expects a surge in IDN purchasing and usage once users no longer have to download plug-ins. That could happen soon because Microsoft plans to offer native support for IDNs in its next version of Internet Explorer, due out later this year. Browsers from Netscape, Mozilla, Opera and Firefox already support IDNs.

"We think IDNs are going to snowball," says Rob Holmes, director of product man-

See ICANN, page 18

Network execs showcase IT plans, projects

Network World's IT Road Map event highlights top technologies for the year ahead.

BY DENISE DUBIE

BOSTON — Some 500 network professionals gathered in Boston last week for *Network World's* inaugural IT Road Map conference and shared their views on pressing technology challenges such as application acceleration, distributed network management and converged networks.

With nearly 50 vendor sponsors, the free one-day conference, which featured six technology tracks, also tackled issues such as security, storage, and wireless and mobility. *Network World* Editorial Director John Gallant kicked off the show with a keynote address that discussed the new imperatives for network executives, such as reducing complexity, becoming application experts and taking steps to prevent security breaches rather than reacting after damage has been done.

"Companies need to identify the business functions they want to excel at, and build and manage their network infrastructure to support and optimize those critical applications," Gallant said.

The conference also featured several case studies from network executives.

Chris Majauckas, computer technology manager for Metrocorp Publications, needed to speed file transfers between offices in Boston and Philadelphia and reduce color-printing expenses for the pages of *Boston Magazine* and *Philadelphia Magazine*.

"We spent $1 million per year on high-end printing," Majauckas explained during a conference breakout session. "Half of that expense, $500,000, was outsourced to an external vendor."

The process involved transferring close to 100 200MB files — or one page of the magazine — between two locations over the course of 100 hours. He purchased new printers and got another T-1 line in the Boston location so art directors could sign off on pages more quickly.

See Event, page 18

Network professionals check out the new technology offerings from about 50 vendors and listen to case studies at *Network World's* inaugural IT Road Map conference last week.

NEWSbits

Lucent, Alcatel eyeing merger

Telecom equipment makers Lucent and Alcatel last week confirmed that they are discussing a possible merger. Such a merger would help them fend off competition from rival equipment makers such as Huawei Technologies and ZTE, which are looking to take market share from the more established players, says Bertrand Bidaud, vice president of carrier operations and strategy at Gartner. In 2001, the two companies held discussions over a possible merger, but the talks ended without an agreement. At the time, reports suggested the talks failed because Lucent had insisted on a merger of equals, with both sides having the same number of representatives on the combined company's board of directors. Last week Lucent also won the bidding to acquire Riverstone Networks after increasing its initial offer by $37 million to $207 million, as well as certain modifications to the asset purchase agreement originally signed by the companies Feb. 7. Lucent's offer topped a $178 million bid from Ericsson.

IDC: IT spending worldwide to dip

Global IT spending should grow by 6.3% this year, driven by software spending, but that growth would be less than the 6.9% in 2005, IDC said last week. Global IT spending totaled about $1 trillion in 2005, and should grow by about $100 billion in 2006. Hardware growth of 9% drove spending in 2005, the "fastest rate of growth since Y2K," said Stephen Minton, vice president of the IDC worldwide IT markets research group. But a pent-up demand for hardware and infrastructure upgrades shouldn't continue at the same pace in 2006, he said. However, software spending should grow by 7%, and hardware and services spending by 6%. Global IT spending grew about 5% in 2004. "It's a little bit better than most industries," he said. "But we don't see IT going back to double-digit growth."

Microsoft pledges to patch IE bug

Microsoft is warning users of Internet Explorer to use caution on the Web, after the disclosure of an unpatched bug that could let attackers seize control of a PC running the browser. The bug, disclosed last week, relates to the way that Internet Explorer processes information using the createTextRange() method. By presenting the browser with specially crafted code, attackers could corrupt the system's memory and trick it into running unauthorized software. "We're still investigating, but we have confirmed this vulnerability and I am writing a Microsoft Security Advisory on this," wrote Lennart Wistrand, security program manager with the Microsoft Security Response Center, in a blog posting. "We will address it in a security update." Microsoft's next scheduled set of security updates are due April 11, but Wistrand did not say whether the TextRange() bug would be patched then.

{quote of the week}

"Legal music sales will plummet just when legitimate alternatives to piracy are winning over customers."

Apple's response to news that French lawmakers have moved ahead with legislation that would weaken anti-piracy fines and require online music providers to drop proprietary formats.

See story at www.nwdocfinder.com/2737

TheGoodTheBadTheUgly

Claria cleaning up its act. Claria, notorious for its adware activities in recent years, says it is getting out of the adware business by mid-year. The company says it is concentrating its efforts now on "consumer and publisher personalization technologies."

FBI agents not getting the message. The agency's top official in New York last week said that some FBI agents are being forced to operate without e-mail accounts due to a money crunch, according to the Associated Press. "[T]he government is reluctant to give all agents and analysts dot-gov accounts," an FBI official is quoted by AP. An FBI spokeswoman, however, told AP that New York City's employees will all have accounts by year-end.

< Story of the Trojan Hearse. Security researchers at Sana Security are warning of a new type of malicious software designed to steal usernames and passwords from Web surfers. The malware, dubbed rootkit.hearse, uses rootkit cloaking techniques, making it extremely difficult to detect. In order to steal information, the software must first be downloaded onto a user's system. This can be done by tricking the user into downloading the malicious code, or by infecting a computer with some other form of malware. Once installed, it sends the sensitive information to a server in Russia that appears to have been in operation since March 16, Sana says.

Sun utility grid takes a hit

The first day that Sun let users buy access over the Internet to its long-delayed public utility grid, a denial-of-service attack forced the company to take down a service hosted on the grid, the company said last week. To let users try out a service that relies on the grid, Sun offered access to a text-to-speech application developed by Callidus Software. When the service was hit by a DoS attack, Sun moved the translation service so that it can be accessed only by users who are logged on to the Sun Grid as a registered user. The service, launched this week, allows anyone to order usage of the grid over the Internet, paying via PayPal. Users pay $1 per CPU per hour.

Patch issued for Sendmail flaw

Internet Security Systems last week said it has uncovered a flaw in the most recent version of the Sendmail open source code used primarily in Unix-based and some Windows-based e-mail gateways. The flaw in the Sendmail SMTP server daemon Version 8.13.5 is called a "signal race vulnerability." It allows remote attackers to craft malicious code to wholly subvert the Sendmail-based server. The Sendmail Consortium has worked with ISS to come up with a patch for the affected Sendmail version. The Sendmail Consortium is strongly advising IT administrators to upgrade to a new version, Sendmail 8.13.6, but the patch is available separately as well.

"Now, not only can you tell where your package is, but also how hard it was thrown into the truck."

Chuck Smith wins this week's prize. Head over to Layer 8 every Monday for the start of a new round. www.nwdocfinder.com/2727

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InfoWorld Review, April 11, 2005	

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Novell preps users for move to Linux

Outlines plan to support NetWare until at least 2015.

BY DENI CONNOR

SALT LAKE CITY — Novell used its BrainShare conference last week to elaborate on its product migration path to Linux, and included an assurance to customers that it will support NetWare well into the next decade.

The annual event, which Novell said drew 6,000 attendees, featured a series of product announcements, including a preview of a new edition of Open Enterprise Server (OES), expected to ship in June 2007. Another new offering is Version 10 of the SuSE Linux Enterprise Server, a suite of workgroup programs and software for mobile users. (For more details, see www.nwdocfinder.com/2738 and /2739.)

The new edition of OES, codenamed Cypress, will run NetWare on Linux only as a guest operating system under the open source XEN or VMware's ESX Server virtualization platforms. Existing OES implementations let IT run a NetWare or Linux kernel.

Many NetWare customers say they will migrate to the Linux-based OES when a NetWare kernel is no longer available. One issue preventing them from doing so now is that Novell's Network Storage Services (NSS) and its file permissions and access rights are not fully supported in Linux.

"We want to stay with the NSS file system, as it has numerous advantages over other options such as the [Windows NT File System] or any of the available Linux file systems," says Chuck Perilli, a consultant in Washington, D.C., who manages seven NetWare 6.5 servers. "We are looking at the NetWare Core Protocol (NCP) on OES-Linux as an option, but our testing has shown there are still a few glitches in Novell's implementation of NSS on Linux."

E. Axel Larsson, enterprise integration specialist for Computing and Network Services at Drew University in Madison, N.J., runs Novell's eDirectory and Identity Manager user provisioning product on Linux, but he voices similar concerns. "We would anticipate moving most of our current NetWare services over to Linux when Novell is able to close the performance and stability gap on file and print services between NetWare and Linux," he says.

NetWare lifeline

Novell last week announced that it has extended product support for NetWare, which is being phased out in favor of Open Enterprise Server.

	Previous end of support	Revised end of support
NetWare 5.1	2010	2015
NetWare 6.0	2011	2015
NetWare 6.5	2013	2015

Jason Williams, OES product manager at Novell, says that while NCP on the Linux kernel in OES does not support the Novell Archive Server or Distributed File System junctions, the Cypress version of OES will. Those junctions allow Windows Common Internet File System clients to access a NetWare 6.5 server. Williams adds that recent tests show NSS on Linux out-performing NSS on the NetWare kernel.

Fernando Seguro, manager of systems engineering for Hartford Hospital in Hartford, Conn., says he is sticking with file and print services on the NetWare kernel for as long as he can.

"We are starting to migrate some services like GroupWise to Linux," says Seguro, who has 25 NetWare 6.5 servers and 10 OES servers. "But Novell needs to continue to support NetWare until everything they make can run on the Linux kernel and is just as easy to implement."

Bill Brush, information systems infrastructure support lead for Nebraska Educational Telecommunications at the University of Nebraska, is concerned about support for 32-bit applications.

"Although Novell says it will continue to support NetWare for at least 10 years, it's probable that within the next five to seven years, hardware demands are going to dictate that I migrate most of my file and print services off the NetWare kernel simply because I won't be able to find hardware that will run 32-bit code," Brush says. "When that happens it is my expectation we'll go with Cypress or one of its descendents."

Brush says he is hopeful that in the next five to 10 years he can convert his office to Linux and eliminate Windows.

John Fagg, manager of storage management at the University of Utah Hospital in Salt Lake City, has no such concerns about Linux.

"We will be migrating all 70 of our Netware 6.5 servers to [OES-Linux]," he says. "We had actually written Novell off a couple of years ago but when they announced that they had purchased SuSE and were moving toward Linux, we decided to stay with Novell." ■

EMC readying storage arrays for small, midsize businesses

BY DENI CONNOR

EMC is expected to announce as soon as next week two arrays designed to make setting up and maintaining IP and Fibre Channel storage-area networks easier.

According to a data sheet obtained by *Network World*, the EMC Clariion AX150 and AX150i are designed for small and midsize businesses or sites that may not be served by experienced storage administrators. The arrays offer an alternative to direct-attached storage.

The Clariion boxes expand EMC's family of AX100 arrays. The new AX150 and AX150i double the capacity of the 3TB AX100 and AX100i, the low end of EMC's AX arrays. They also use the Serial ATA II disk interface for 3G byte/sec data transfer to and from disk. The current AX100 and AX100i use the 150M byte/sec Serial Advanced Technology Attachment interface.

Although EMC declined to comment, what is known about the new arrays is that they are 2U (3.5-inch high) rack-mountable systems with three to 12 250GB or 500GB Serial ATA drives for a total capacity of 750GB to 6TB.

The AX150 Fibre Channel array supports SAN or direct-attached connections to host computers. The AX150i has an iSCSI interface for connection to the Gigabit Ethernet network.

Both support connections to as many as 10 Windows, Linux, NetWare or Solaris hosts, and 256 host connections to storage. The arrays come in single- or dual-controller models for high availability.

The arrays ship with EMC's PowerPath for AX150 software, which offers availability via path failover and load balancing. They support RAID 5 and RAID 0+1, and feature as much as 512MB of battery-backed cache memory, redundant cooling fans and power supplies.

Included with the arrays is EMC Navisphere Express installation and management software.

Like the EMC Clariion AX100, the AX150 and AX150i are expected to be available from Dell, Computer Discount Warehouse and TechData.

EMC's AX arrays compete with offerings such as the HP StorageWorks MSA1000 Small Business SAN Kit, which includes the HP Modular Smart Array 1000, two QLogic SANblade host bus adapters, an eight-port Fibre Channel switch and management software. ■

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Watch out Red Hat

Novell President and COO Ron Hovsepian says his company is getting ready "to step on the gas pedal" to move its Linux business forward. Read our interview.

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Microsoft plays games with Vista ship date

Business version of Vista to ship in 2006, but new hardware won't be available until January.

BY JOHN FONTANA

Microsoft last week delayed release of the consumer version of Vista, but said the two business versions would ship in November.

However, observers say the move appears to be a marketing ploy to fulfill promises of a 2006 ship date rather than a response to demand from corporate customers.

The release of the business versions of Vista is muted by the fact that volume-licensing customers will be able to install Vista only on existing PCs, many of which will not be up to the task of running the operating system. New PCs preloaded with Vista won't be available to anyone until January.

It is unclear how Vista will perform on older hardware because Microsoft hasn't revealed the minimum hardware requirements for running the client operating system.

But currently published guidelines for Vista hardware configurations indicate that corporate customers likely will be forced into a hardware upgrade to achieve the full functionality of the operating system.

"I challenge you to purchase a machine today that will ultimately or optimally exploit Vista," says Michael Cherry, an analyst for Directions on Microsoft.

Historically, Microsoft releases hardware requirements a month or two before a new product ships. The current Vista guidelines for beta testers call for hardware with a "Designed for Windows XP" logo, 512MB of RAM and a DirectX 9 class graphics processor unit (GPU).

To get the full Vista experience, users will need a GPU that supports the Windows Display Driver Model. Without it, users will see only a "Windows XP-comparable desktop graphics experience," according to Microsoft.

"It is unconscionable that Microsoft has not set the hardware requirements, and pointing to the logo [doesn't help] because you have to be an electrical engineer to understand that," Cherry says.

"The hard and fast hardware requirements will come out soon. There is still a lot of performance testing going on," says Mike Burk, product manager on the Windows client team at Microsoft.

It's likely that the new hardware requirements will force Windows 2000 Professional users, the group that Microsoft sees as the most obvious upgrade candidates, to purchase new hardware.

"Vista is not like Windows 2000 or XP, where you could swing with old hardware and get away with it," says John Kretz, president of system integrator Enlightened Point Consulting Group in Phoenix.

The bottom line is that November adopters likely won't get more than a cursory look at Vista before it is generally available on store shelves and pre-installed on new PCs in January, a reality that even Microsoft is hinting at.

"This will allow businesses to begin their final testing and deployment efforts prior to the end of the year," says Jim Allchin, the co-president of Microsoft's platforms, products and services division.

Allchin says the split in the release of Vista versions will allow all OEMs to get their products to market at the same time. He also confirmed that a beta 2 of Vista would ship before the end of June and go out to more than 2 million testers. ■

Correction

■ The story "Mobile workers tap unified messaging" (March 20, page 38) misidentified a company as Unified Communications. It should have been Interactive Intelligence.

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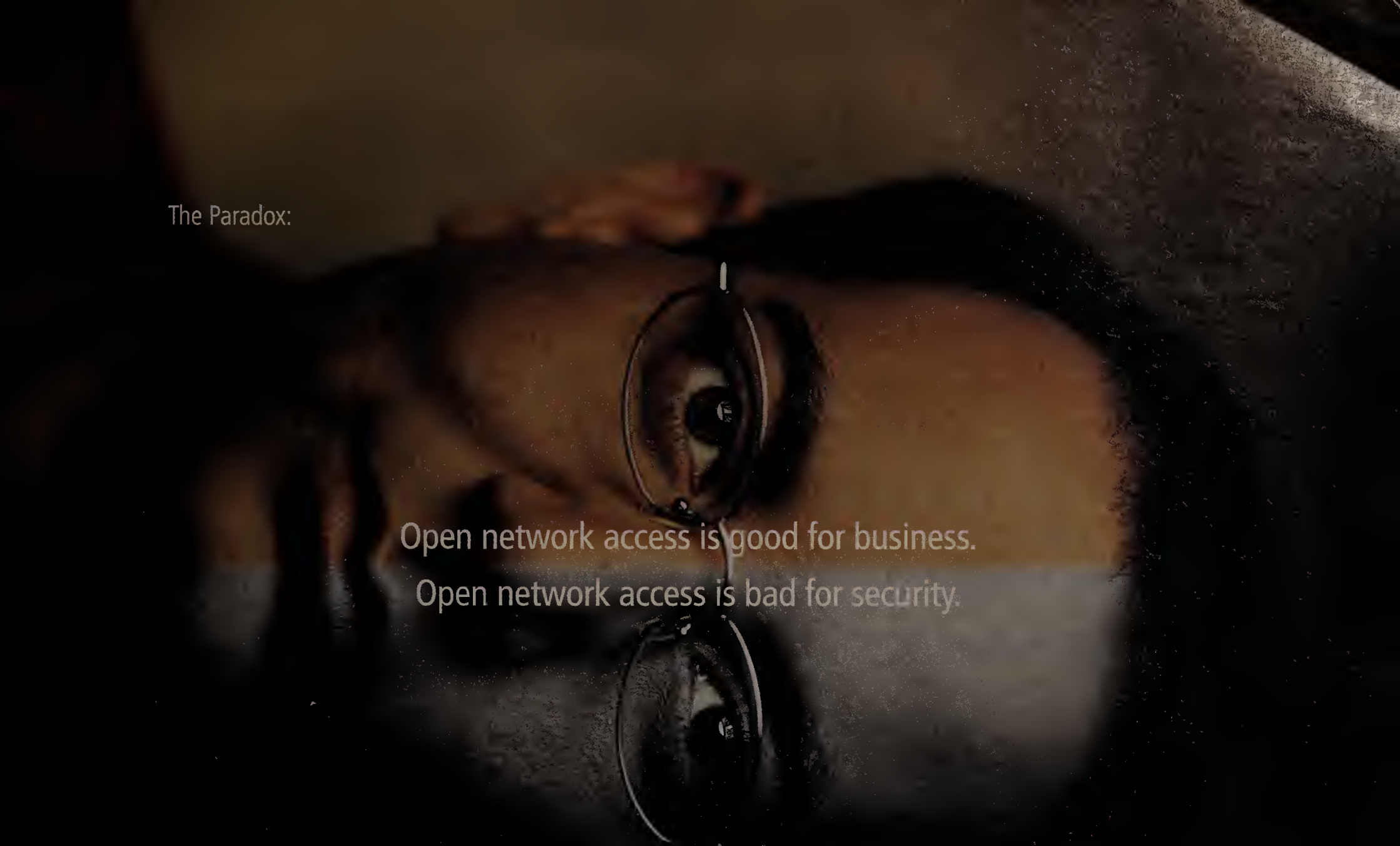

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Carrier CEOs: We won't block 'Net

Companies use TelecomNext conference to allay fears of preferential Internet content delivery, access.

BY JIM DUFFY

LAS VEGAS — Telecom executives and regulators last week attempted to clarify their positions on 'Net neutrality, an increasingly contentious issue given the growth and importance of the Internet and consolidation producing more powerful players.

Verizon CEO Ivan Seidenberg suggests a partnership between carriers and regulators.

At the inaugural TelecomNext conference in Las Vegas, CEOs from the major carriers pledged not to block access to Internet content but sought non-regulated solutions to capture a return on their infrastructure investments to carry it. Regulators promised that any required policies would ensure unfettered, equitable access to and distribution of that content and would not discourage further investment.

Hanging in the balance are potentially higher costs for enterprise telecom services if carriers are precluded from recouping their network capacity and content delivery investments from consumers or content providers.

Further muddying the waters is ambiguity around the actual definition of 'Net neutrality.

"Whenever somebody walks into my office and asks, 'Are you for 'Net neutrality,' I say, 'What is it?'" said FCC Commissioner Deborah Taylor Tate during a keynote address.

Generally, 'Net neutrality refers to the unbiased delivery of Internet content even if it competes with content from the carrier or if the content provider pays less — or nothing — for that carriage. The fear in the industry is that carriers will charge content providers for varying levels of service quality and capacity for content carriage, and block or degrade service of content from providers that do not pony up (www.nwdocfinder.com/2743).

This is the concern CEOs of the major carriers sought to appease at last week's conference.

"AT&T will not block access to the public Internet or degrade service [of content providers], period," said AT&T Chairman Ed Whitacre, who prefaced the keynote address remark by saying he was not familiar with the definition of 'Net neutrality.

"I don't even know what that means," he said, perhaps suggesting that different constituencies have different definitions.

Nonetheless, Whitacre sought to turn the tables on supporters of 'Net neutrality, some of whom have assailed AT&T's $67 billion acquisition of BellSouth as a move to limit competition and customer choice in telecom services.

"There are really no competitive issues at stake," Whitacre said. "But that has not stopped some from making the merger a referendum on 'Net neutrality. They want to scare people into thinking that access to the Internet is at risk."

Advocates of 'Net neutrality limit choice, he said, by attempting to not bear any of the expense of the network capacity required to carry their content.

AT&T's Ed Whitacre says his company will not block access to the Internet.

"They say, 'Go ahead and build more lanes but let the construction crew pay for it,'" he said.

Whitacre said AT&T is exploring creative ways to deal with those capacity and upgrade costs through commercial agreements with content providers looking to distribute their services over the AT&T network.

"The interests of the network and content providers are intertwined," he said.

BellSouth CEO Duane Ackerman also sought to quell fears that the combined company would exercise control over Internet content access. It is the largest carrier in the United States, with $120 billion in revenue, 71 million residential phone customers in 22 states, and the leading share of business voice and data customers.

"Let me be clear," Ackerman said during another keynote, "managing our networks is not about controlling where people go on the Internet. Why would we want to violate our customers' trust? It wouldn't take long for the market to punish us."

AT&T rival Verizon supports Whitacre's call for commercial agreements between carriers and content providers for mutually beneficial carriage, distribution and delivery of Internet content.

"We need to find the right business models and partnerships," said Verizon CEO Ivan Seidenberg during the conference's kickoff keynote address. "The marketplace is telling us there's great opportunity out there."

Seidenberg also suggested a partnership should be forged between carriers and government regulators to ensure equitable delivery of all Internet content and continued investment in content delivery networks. He used Korea, which built a 100Mbps-to-the-home broadband network with government assistance after a two-year economic slump, as an example. "It shows what happens when business and government come together, share a vision [and] have a winning mind-set about taking control of your own future," he said.

Content producer Walt Disney Co. was more emphatic on the role it believes regulators should play in 'Net neutrality.

"We do not support litigation at this time," said Disney CEO Robert Iger. "The free market should reign."

FCC Chairman Kevin Martin said the commission has the authority to act on 'Net neutrality and is "committed to taking action when necessary." But he promised that whatever action the commission takes to protect consumers and content providers will be business friendly.

"We have to have a regulatory environment that allows companies to invest and recoup those investments," Martin said. ■

Verizon gains regulatory relief on pricing

BY DENISE PAPPALARDO

The FCC last week granted Verizon regulatory relief for a handful of high-speed data services, essentially giving the carrier the ability to charge whatever it wants for them.

Industry watchers weren't surprised by the move, but they say the way the decision was issued was a bit unorthodox.

In December 2004, Verizon filed a petition with the FCC seeking relief from regulations on pricing. FCC rules call for such petitions to be granted if not acted upon within a specified length of time, usually one year although it could be longer if an extension is granted, which was the case here. The commission took no action, so Verizon's request was granted.

Prices aren't expected to rise immediately, since Verizon will likely aim to be competitive and because large customers typically negotiate contracts well below tariff rates. But that may change as other carriers follow suit and get the same regulatory relief.

"Who can blame them," says Colleen Boothby, a partner at law firm Levine, Blaszak, Block and Boothby, which specializes in negotiating telecom contracts valued in the hundreds of millions of dollars for large corporations. When an agency deregulates based on a misunderstanding of the telecom industry, carriers are going to take advantage of that, Boothby says.

The commission says the telecom market is competitive and therefore should be deregulated, Boothby says. She agrees that is true in general but says there is not sufficient competition for some services, such as T-1 and T-3 private lines. This is where customers could see price hikes.

Johna Till Johnson, founder and chief research officer at Nemertes Research and a *Network World* columnist, says customers need to include more carriers in their RFPs in an effort to avoid price hikes. "There are good alternative providers out there like MegaPath, Fiberlink and Masergy," she says. Users have to consider other options so they don't feel forced to use only local exchange carrier-enabled services, she says.

Johnson also recommends users include cable companies in their RFP process. She says cable companies generally do not offer enterprise-quality services today, but that could change if the cable companies announce strong offerings for businesses.

Some industry watchers say that because the FCC granted Verizon's request without official comment, the carrier is left to interpret the decision as it wishes.

Boothby points out that there is confusion about what services are affected by the decision. In February Verizon filed an addendum to its December 2004 request that stated the services from which it seeks regulatory relief. The services include frame relay, ATM, IP VPN and transparent LAN service.

Verizon says that T-1 and T-3 services are not part of its request. Boothby disagrees. On behalf of The AdHoc Telecommunications Users Committee, her firm filed comments with the FCC pointing out how these private line offers are part of the services that have now been deregulated.

In Verizon's tariff, which it was required to file prior to deregulation last week, Boothby says that Verizon includes T-1 and T-3 connectivity as components of its frame relay, ATM, IP VPN and transparent LAN services. Her law firm's comments filed with the FCC say Verizon "simply misrepresents the services covered by Verizon's ... petition." ■

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Higher education embraces shared net services

BY JOHN COX

Colleges and universities no longer can afford to go it alone trying to meet campus demand for network and IT services.

That warning came last week from the president of Educause, a nonprofit group that focuses on IT issues in higher education. At least some of his listeners are heeding the warning.

Later this year, for example, health studies undergraduates at Simmons College, in Boston, will be able to log on to the high-end WebCT Vista course-management application from WebCT to review new course content. The students will be able to call or e-mail a help desk if there's a problem.

Simmons will not own the application, the tech support or the gigabit fiber network over which student sessions run. The 3-year-old network was created by the Colleges of the Fenway, a group of five private schools, including Simmons, and one public institution, all located near each other.

"Building trust is the most important thing" when schools work together on network and IT projects, says Robert Kuhn, executive director of technology at Simmons College in Boston.

Common services

The group formed in 1995 to explore ways of sharing and funding common services. The course-management application and tech support will be provided by the University of Massachusetts' UMassOnline division, which functions as an application service provider to Colleges of the Fenway and other schools in the state.

In a speech at last week's annual Northeast Regional Computing Program (NERCOMP) conference in Worcester, Mass., Educause President Brian Hawkins urged IT professionals to change the long-standing mind-set of independent institutions that are completely self-contained. "You will lack the needed [IT] resources if you see your campuses as self-contained," he said.

Shared purchasing and software licensing plans have been a feature of NERCOMP for some time, he noted. But another opportunity is outsourcing some functions to other institutions.

Extended range

In a later interview, Hawkins said that digital networks mean provisioning, running and supporting IT services are no longer limited by time or distance. "Indiana University is one of the best in the nation for [IT] security," he said, offering an example. "They could monitor the network for Wheaton College here in Massachusetts."

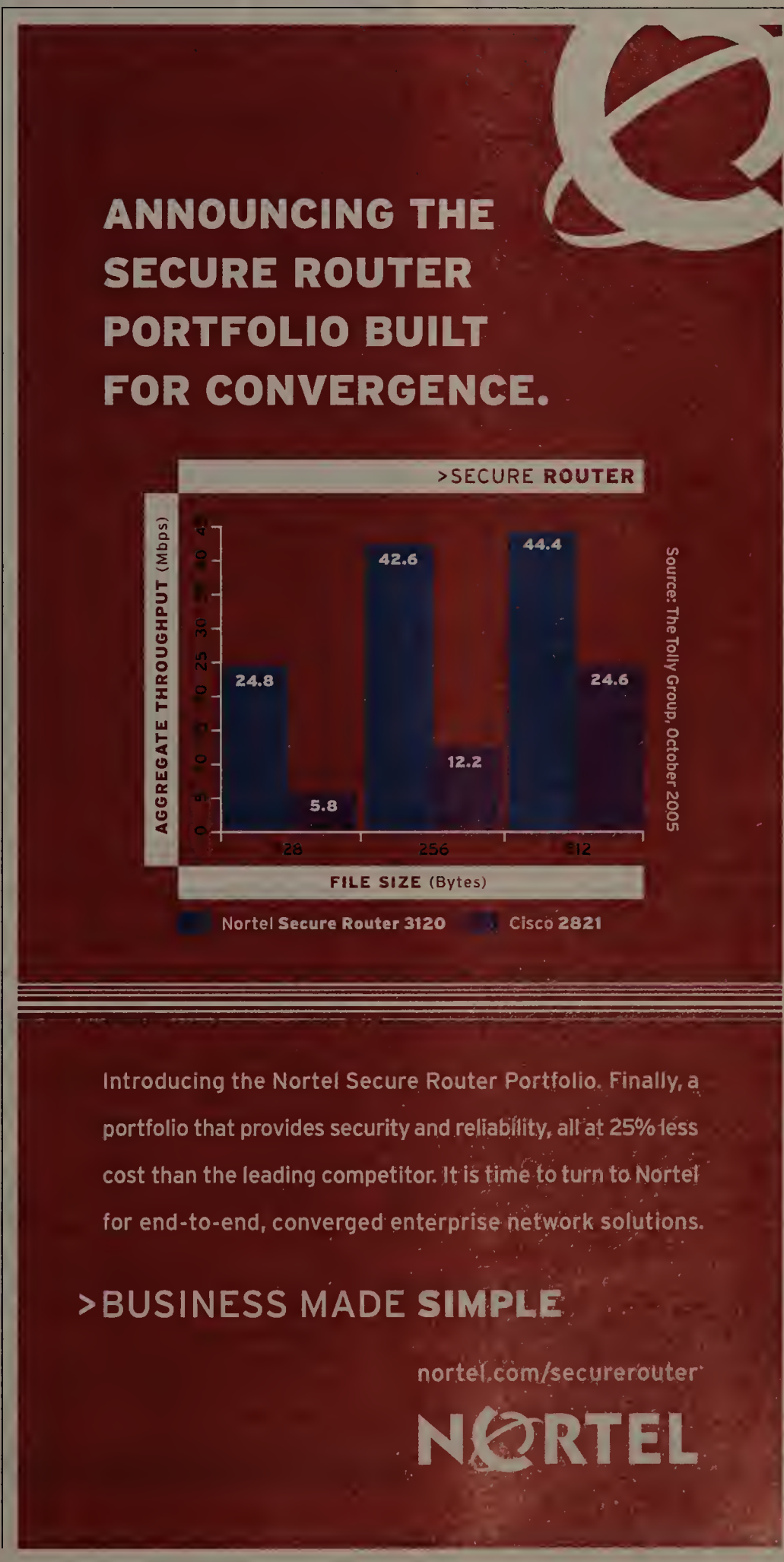
Simmons started upgrading from its Campus edition to the Vista edition of WebCT last year, and had a clear idea of the costs in terms of additional hardware, a new database administrator, training and other deployment expenses, says Robert Kuhn, Simmons' executive director of technology. Simmons, in effect, would host the application for the other members of its consortium.

But UMassOnline was already deploying the Vista application and was willing to make the service available for a fee. It had resources that Simmons couldn't match, such as additional servers for load balancing and redundancy, and around-the-clock tech support, Kuhn says.

The Fenway schools contracted with WebCT for the software licenses and with UMassOnline for the hosted service. "It comes out to be about one-quarter of the cost with UMass hosting as doing it ourselves," Kuhn says.

But he warns IT executives not to assume that because a project is a collaboration it will automatically save money. There are hidden costs and issues to shared services.

The security model for a shared service is very different from the model that's typically added to a stand-alone application, Kuhn says. The shared system has to isolate and protect data from different institutions, for example. Some applications aren't designed to do so. ■



ICANN
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agement at Register.com, a leading domain name registrar. "We currently have IDNs in 40 extensions. The greatest preponderance of them is in .com, .net and .org. But a big growth area is for .de [Germany] and .cn [China]."

IDNs represent 4% of Register.com's portfolio, but that figure is up from 1% a year ago.

"A lot of IDNs are bought by European-based companies," Holmes says. "We see a cross section of financial institutions, heavy industry, automotive and some pharmaceuticals."

In the United States, few corporate IT executives are aware of the risks surrounding IDNs.

Mike Hogan, vice president of operations at Turbine, a Westwood, Mass., provider of online games including Dungeons & Dragons, says he relies on the company's partners in Europe and Asia to run local Web sites and provide content in the areas' native language.

"We partner with Codemasters in Europe and Shanda in China, and it's up to them to procure the domains," Hogan says. "We ultimately have the domains transferred to us. Our partners localize the Web sites and manage and run their own operations. They provide the content."

Hogan says Turbine owns 60 domain names and buys additional domain names whenever it launches a new game.

"It's unfortunate that we can't have a global standard" for IDNs, Hogan says. "Am I concerned about localization issues? Yes. That's why Turbine partners with local companies."

Experts say the lack of a standard way of resolving IDNs could leave Web sites more vulnerable to security problems such as phishing and spoofing because the DNS will not have a single, authoritative root.

"Until now, we've had one DNS root that remains secure. Now we'll have to worry about 253 different roots, one in each country," Jaffe says. "There's no way for companies to monitor that to make sure that something hasn't been compromised. They won't know until a customer complains."

Jaffe says the threat of a fractured DNS root is real, and that ICANN needs to move quickly to resolve the threat.

"ICANN really needs to step up and deal with balkanization of the Internet. The fracturing of the root is a public thing; it's not like it's being hidden," Jaffe says. "The fractured roots are coming about to enable IDNs by countries. Once there's a fractured root, that allows for a number of other things to occur, including spoofing."

IDNs are increasingly a flash point as the international community gets more and more frustrated with ICANN's lack of responsiveness to this and other domain name issues.

"The biggest concern that a multinational ought to have is the fact that ICANN is failing and is about to lose its position of maintaining a homogeneous DNS," says Champ Mitchell, CEO of domain registrar Network Solutions. "If ICANN doesn't get back on track and start serving its various constituencies, we are headed down the pathway of splintering the Internet.... That scares us." ■

ICANN under fire

Latest developments in the long-running ICANN saga:

- **March 17:** Canadian Internet Registration Authority says it will suspend contributions to ICANN until the oversight body institutes accountable, transparent and fair processes.
- **March 1:** Chinese Ministry of Information Industry announces it is creating three of its own top-level domains — .cn, .com and .net in Chinese — without ICANN's permission.
- **Feb. 28:** ICANN board approves new agreement with VeriSign that allows VeriSign to operate the .com registry until 2012. Decision prompts outcry from the domain name industry.
- **Feb. 23:** U.S. Department of Commerce issues request for information about re-bidding the technical functions handled by ICANN. Memorandum of understanding with the Commerce Department expires in September.

Event
continued from page 7

He also rolled out a packet sniffer to watch traffic over the VPN to better understand what applications consumed traffic.

After considering several options later deemed too manually intensive or costly, the company chose to work with Orbital Data and its application acceleration appliances. Orbital Data delivers rack-mountable appliances loaded with software that address high-speed connections and data transfers over WANs.

By installing one appliance in Boston and one in Philadelphia, Majauckas said he reduced file transfer time for one page from more than one hour to about six minutes.

"The pages transfer almost as though we are working on a local LAN," he said. "And other applications between the two offices can take advantage of the compression and acceleration technologies."

Majauckas said it now costs $150,000 to process the pages for art department approval, compared with the $500,000 previously paid to the external vendor.

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The transition to VoIP

For Fran Lorion, CIO of the Visiting Nurse Association of Boston, converging his data and voice networks didn't deliver an immediate ROI. While VoIP promises network managers cost savings and efficient operations over a converged network, significant and time-consuming onsite customizations can eat into those benefits.

Lorion's goal was to develop a new application that would enable staff to more efficiently address patient calls by recognizing incoming call numbers and associating them with known patient information in the organization's databases.

His priority as an IT provider was to ensure optimal patient care at the 120-year-old association, which has 15,000 patients and whose staff makes more than 300,000 home visits per year.

As he planned for a phone system upgrade, he decided rolling out VoIP would be the best option and eliminate the need for another upgrade in the next few years.

But improving the network to support voice posed challenges. Lorion said he wasn't prepared for the data network's response to voice traffic. And he needed to keep the data network — which comprises about 275 desktops, 284 laptops and 26 servers — in operation while implementing voice.

"We have between 200 and 300 users on the data network so I couldn't unplug the network to make the changes," Lorion said. "We were most confident about our network going into the project, but ironically it was the network that gave us the most difficulty."

Consultants and the VoIP vendor helped Lorion implement configuration changes to the routing and switching infrastructure, and the rollout was back on track in a couple of months.

"Overall our rollout experienced a two-month delay and we came in slightly over budget," he said.

Tackling distributed management

Monitoring network nodes can be challenging, considering today's geographically distributed networks.

Jim Maas, network monitoring engineer at Fresenius Medical Care in Lexington, Mass., is working to integrate multiple network management tools and get an accurate read on service delivery across some 1,300 distributed clinic locations. Maas also is working to include potentially 600 more clinics across the country in his monitoring network. He explained that he uses CiscoWorks, SolarWinds and the open source application Cacti to better understand how the application is traveling across the network.

"We are geographically distributed and I have to make sure the network is up so patients are getting the care they need at all times," Maas said. "I monitor to spot systems in trouble before they go down and work to prevent any failures."

With monitoring tools in place to collect management data from network routers, switches, servers, applications and client devices, Maas said this year he is working to get an "end-to-end representation" of the user experience.

"The network could be experiencing no problems, but that doesn't mean the application is getting to the user in good time," he said. ■

Check Point, Sourcefire call off merger

BY ELLEN MESSMER

Check Point is no longer planning to acquire Sourcefire. Both companies last week affirmed they have opted to call off the merger, which was announced last October.

Executives at both firms, which sell network security-protection gear, were not available for comment by press time. However, statements from Check Point and Sourcefire said they have agreed to withdraw the legal paperwork that had been filed with the U.S. government to get through regulatory requirements associated with the merger.

In the statements, neither Check Point nor Sourcefire offered a reason for withdrawing. However, the merger, which had to proceed through customary government channels for approval, faced opposition from agencies such as the Department of Defense and the FBI, because Check Point is a foreign-based firm.

In its statement, Check Point, founded in Israel, said the two companies instead will work together to "create a customer-focused business partnership."

"We've decided to pursue alternative ways for Check Point and Sourcefire to partner," Check Point CEO Gil Shwed said. ■

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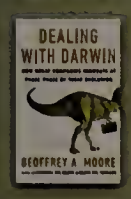

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Conference At-a-Glance *(subject to change)*

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Registration Open 8:00am - 7:30pm

9:30am – 11:55am	Concurrent Sessions (Primer, Career Development, SNIA Tutorials, etc.)
11:55am – 1:00pm	Luncheon
12:00pm – 5:00pm	Pre-Conference Golf Outing
1:00pm – 5:25pm	IDC Analyst Briefing
1:00pm – 5:25pm	Concurrent Sessions (SNIA Tutorials, End-User Case Studies, etc.)
4:40pm – 6:15pm	End User Town Hall Meeting
5:00pm – 7:00pm	Speed Dating with IDC: A Channel Partner Networking Event at SNW
7:00pm – 9:00pm	Welcome Reception

TUESDAY, APRIL 4

Registration Open 7:00am - 7:00pm

7:00am – 8:00am	Breakfast
8:00am – 12:30pm	General Conference Sessions
12:45pm – 2:00pm	Luncheon
2:10pm – 5:40pm	Concurrent Sessions (SNIA Tutorials, End-User Case Studies, etc.)
5:40pm – 8:40pm	Expo with Dinner and Solutions Center

WEDNESDAY, APRIL 5

Registration Open 7:00am - 6:30pm

7:15am – 8:15am	Breakfast
8:15am – 12:15pm	General Conference Sessions
12:15pm – 2:00pm	Expo with Luncheon
12:15pm – 7:15pm	Solutions Center Open
2:10pm – 5:40pm	Concurrent Sessions (SNIA Tutorials, End-User Case Studies, etc.)
4:00pm – 7:00pm	Expo and Solutions Center Open
7:00pm – 9:30pm	Gala Evening with Dinner and Entertainment
9:30pm – 11:00pm	Post-Gala Reception

THURSDAY, APRIL 6

Registration Open 7:30am - 10:00am

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12:00pm	Conference Concludes

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- ❑ Non-Tech: Government - Federal (including Military)
- ❑ Non-Tech: Healthcare/Medical/Pharmaceutical/Bio-Tech
- ❑ Non-Tech: Insurance/Real Estate/Legal
- ❑ Non-Tech: Manufacturing & Process Industries
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Your Job Title/Function:
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- ❑ IT Management: Director
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- ❑ IT Management: Technical Consultant
- ❑ IT Management: VP
- ❑ Business Management: CEO, COO, Chairman, President
- ❑ Business Management: Other Corporate, Business Manager
- ❑ Other: Non-Manager

What is the one item that best describes your involvement in the IT purchase process?
- ❑ Authorize/Approve Purchase
- ❑ Set Budget for Expenditures
- ❑ Evaluate/Recommend Products, Brands
- ❑ Determine Need to Purchase
- ❑ All of the above
- ❑ None of the above

Number of employees in your entire organization (ALL locations)
- ❑ Over 20,000
- ❑ 10,000 - 19,999
- ❑ 5,000 - 9,999
- ❑ 1,000 - 4,999
- ❑ 500 - 999
- ❑ 100 - 499
- ❑ 50 - 99
- ❑ Less than 50

What is your organization's annual IT/IS budget for all IT/IS products?
- ❑ $1 Billion or more
- ❑ $500 to $999.9 Million
- ❑ $100 to $499.9 Million
- ❑ $50 to $99.9 Million
- ❑ $10 to $49.9 Million
- ❑ $1 to $9.9 Million
- ❑ $500,000 to $999,999
- ❑ $250,000 to $499,999
- ❑ $100,000 to $249,999
- ❑ Under $100,000
- ❑ None

What is the estimated annual revenue of your entire organization?
- ❑ Over $10 Billion
- ❑ $1 Billion - $9.9 Billion
- ❑ $500 Million - $999 Million
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NET INFRASTRUCTURE

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Force10 touts 10G Ethernet switch

Y PHIL HOCHMUTH

Force10 this week is expected to nnounce an all-10G Ethernet stackable witch targeting super high-end computer usters and corporate data centers eploying 10G connections to servers and orage boxes.

The S2410 has 24 10G Ethernet ports that an be fiber-based or copper using the X4 standard for short-run 10G Ethernet nks. Force10 says the device provides xtremely low traffic latency that rivals the erformance of proprietary high-speed interconnect technologies or InfiniBand, but with lower-priced and less-complex Ethernet technology.

The S2410 can sit between a bank of servers with 10G Ethernet network interface cards and a data center backbone switch. The device also can be deployed as a 10G aggregation switch, linking clusters of Gigabit Ethernet-connected servers to a chassis-based 10G Ethernet core switch.

The S2410 provides Layer 2 switching at full speed on all ports simultaneously, for a total switching capacity of about 2.4Tbps in a single-rack-unit device. Besides its high density, Force10 says the box's top feature is its fraction-of-a-second delay to move Ethernet frames through the device.

S2410 design engineers say the switch can move traffic with as little as 300 nanosec of latency, while most Ethernet switches measure traffic latency in milliseconds. (By comparison, latency in InfiniBand gear such as Voltaire's Grid Switch ISR and Cisco's SFS 7000 InfiniBand Server Switch ranges from 140 to 200 nanosec.)

The S2410 features 24 10G Ethernet ports that can be fiber-based or copper.

Nanosecond latency — the measurement used in server and PC memory and processor latency factors — is required for distributed network gear connecting clustered computer systems sharing memory processes across physical-hardware RAM over a network. Traffic running between such nodes will produce errors unless the information delay between computers is as low as it would be inside a single computer, experts say. InfiniBand or proprietary interconnect products from such vendors as Myrinet or Dolphin are usually used for such deployments.

The S2410's lean design, with a single ASIC and one-switch fabric, allows for this low latency when moving Ethernet frames.

"There's no routing table lookups [because the switch is Layer 2 only] and less components for traffic to flow through," which can introduce latency inside a switch, says Steve Garrison, Force10's marketing director. Other single-rack-unit 10G switches that compete with the S2410 include Foundry's eight-port EdgeIron 8X10G switch and HP's ProCurve 6400cl switch.

The S2410 costs $20,000 for the CX4 copper version, or about $830 per port. The fiber version, at a base price of $30,000, does not include XFP optical transceivers, which could double the base price. The switch is expected to be available next month. ■

Short Takes

■ **SMC Networks** last week launched its TigerStack II 1000 family of stackable 10G and Gigabit Ethernet switches that support IPv6. The 24-port TigerStack II 1000 SMC8824M and 48-port SMC8848M support Layer 2 switching and Layer 3 routing of IPv6 and IPv4 packets. In addition to 24 or 48 ports and 10/100/1000Mbps Ethernet, both boxes include four auxiliary ports that can be fitted with XFP modules for Gigabit Ethernet fiber or copper uplinks; two of the ports can accept a 10G Ethernet XFP module. Stacking technology also lets as many as eight TigerStack II 1000 switches link up with a high-speed interconnect and act as a single switch with failover capabilities among the individual devices. The TigerStack II 1000 switches are expected to ship next month and cost $2,500 for the 24-port version and $4,000 for the 48-port box (not including optical XFP uplinks).

■ **Cyveillance,** which provides online risk monitoring to banks and other online businesses, announced its service-level agreements now come with a guarantee that its phishing-attack response service will be able to detect a phishing site and remove it from the Internet within five hours of a client request. Another SLA guarantees 99.9% uptime for the Cyveillance Intelligence Center Portal, which customers use to observe attack patterns and other information.

SECURITY INSIDER
Mike Rothman

My beliefs about security

I'm a big fan of Tom Peters. Right — the Tom Peters who wrote *In Search of Excellence* and *The Brand You*. When Tom turned 60, he packaged up a list of 60 things he believes in in a book called *Sixty*. Many of the things are simple but frequently forgotten. It's useful to go back through these ideas every so often to remind ourselves what we should be focusing on.

Because you are still getting a feel for this column, I thought I would discuss things I believe about security.

Security is too complicated. We as security and network professionals pride ourselves on how we mask complexity for our users. That's the wrong goal. We should be eliminating complexity. There are too many boxes, too many niche products and too many activities that step all over each other. It's hard to believe, but by looking at security pragmatically and simplifying our security infrastructures, we can make technology easier to use and more secure.

Big is the new small. For a long time, small start-ups ruled the roost. It was cool to buy innovative technology, even if it required a totally different management hierarchy. Most folks I talk to are tired of this. They want an architecture-based solution from a stable vendor. They want innovation, but they want it to fit into their existing security infrastructure. They want to stop integrating disparate security technologies. All other things being equal, they want big.

Compliance is good for you. I know I'm out on a limb here. But if you look back six or seven years, before the Health Insurance Portability and Accountability Act and the Gramm-Leach-Bliley Act, security was a mess and there was no standardization. You couldn't tell your boss if your security was good or bad. Regulation changed this. It made us think about simple blocking and tackling. It made us document what we were doing. And ultimately it made someone accountable for protecting sensitive information. The topper has been security funding that wasn't available before.

We don't teach; we fix. If we spent half as much time teaching our clients what not to do as we spend cleaning up after them when they mess up, we'd all be better off. So maybe you require new employees to read the acceptable use policy and sign it. But have you taught them how to recognize a phishing message? Or how to detect a spyware site? Or made it clear that they should not be using their iPods on corporate machines? User education is a gaping hole in everything we do, and we need to fix it.

Security is a feature. The fact that there is a business for stand-alone security technology means the providers of network, data center and application technologies are not getting the job done. Security should be baked into everything we do. Yes, this is optimistic, and getting there will take a long, long time (at least 10 years). But if you look at the major players in security, there are only a handful that focus on security. The others control — you guessed it — the networks, data centers and applications.

So there you have it. I cannot cover the entirety of what I believe in one column, but it's a start.

Rothman is president and principal analyst of Security Incite, an analyst firm focusing on information security. Read his blog at http://feeds.feedburner.com/securityinciterants or send e-mail to mike.rothman@securityincite.com.

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ENTERPRISE COMPUTING

Stratus extends fault-tolerance reach

Server company's Solutions Services Group targets managed services.

BY JENNIFER MEARS

Stratus Technologies is pushing into the managed services world, where it hopes its expertise in high availability will attract customers in such industries as financial services, e-commerce and manufacturing, where continuous uptime is critical.

At its Stratus World user conference in Las Vegas this week, the company expects to launch its Solutions Services Group, which will work with partners to help customers create, deploy and manage IT environments that are always on — from the server to the network to the applications.

This summer, Stratus plans to unveil its Continuous Availability service platform, which is designed to give customers greater insight into and control over their systems (see graphic).

The managed services are a departure for Stratus, which has offered professional services in the past, but for the most part limited to the deployment of its fault-tolerant systems. Now Stratus will offer its fault-tolerant expertise across the IT environment.

Hotel Booking Solutions, which handles availability and reservations for some of the world's leading hotels and travel Web sites, is a Windows shop that has used a Stratus ftServer as a fault-tolerant platform for its database for about three years. In the third quarter of last year, the company, which collocates in Equinix data centers, began looking for a managed-services provider as it planned to move data centers and prepared for expansion.

"I wanted to move up to a managed-service approach and basically let our company focus on what we do best, which is writing software, and get out of the business of handling big production IT," says Greg Berman, vice president of engineering for the Atlanta-based company.

The company was drawn to Stratus hardware because the vendor partners with Microsoft to provide 99.999% uptime on Windows. Discovering that Stratus could also offer remote managed services for a continuously available business environment came as a surprise, Berman says.

"We went down a path that included IBM, EDS and other household names," Berman says. "Stratus was able to take our network design, they were able to take our overall Equinix design and run it through their models to tell us whether it was going to hold up or not."

The key advantage with Stratus is that the company zeroed in on the 99.999% availability that the online business needed, Berman says. "They were the only people from a consulting perspective that could walk us down that path to validate a lot of the design assumptions that were made," he says.

Stratus focused on the network architecture, keeping in mind factors such as security and disaster recovery to create a design that would keep data secure yet be able to scale, Berman says.

Today, Hotel Booking Solutions handles about 50 requests per second, but that could grow to as many as 3,500 requests per second as the company expands over the next few years, he says.

"I have to be able to support, from a high-availability perspective, new features and functions that will drive our transaction rate through the roof," Berman says. "With Stratus, I'm now able to do that without adding IT staff."

Donna Scott, a vice president and distinguished analyst at Gartner, says Stratus' services are worth a look by companies that don't have in-house resources to monitor critical business applications and infrastructure.

She says the move is a good one for Stratus, but notes that the company still faces challenges.

"The biggest challenge is scaling the service ... which generally requires more of a standardized computing environment across many customers," she says. "If they are able to bring a greater homogeneity to their clients, and standardize their own processes, they will be more profitable than if every client has different monitoring and management requirements." ■

Continuous availability

Stratus' new service platform builds on its 25 years of experience with fault-tolerant hardware to:

- **Ensure infrastructure integrity.** Stratus engineers work with customers to assess and design computing and networking components to ensure critical business processes stay up and running.
- **Monitor performance.** Remote services oversee workflow guidelines based on IT Information Library rules, assuring performance meets certain levels; an online portal offers real-time information on application performance, data security, data management and data availability.
- **Continuously update environment.** Round-the-clock proactive monitoring to ensure IT environments are updated for utmost reliability.

HP design shift gives its AMD servers more speed

BY BEN AMES, IDG NEWS SERVICE

HP last week began sales of PC servers with faster processors, using the latest line of dual-core offerings from Advanced Micro Devices.

HP called the design change a "speed bump," because it represents an upgrade of servers that were based on technology from AMD.

"Customers like speed-bump upgrades, because they don't have to do requalification in their labs. It's the same model, so they can just plug their applications into the new device," says Steve Cumings, group manager for ProLiant Opteron Systems at HP.

"And they like AMD because it offers good performance per watt; many of our customers are worried about how much power they can get into their data centers to run those things," he says.

The new processors include three models of AMD's dual-core Opteron design, 185, 285 and 885. All three are designed to increase performance while holding power consumption at 95 watts or less, Model 185 is made for smaller servers and workstations, while Model 285 is meant for high-performance workstations and Model 885 for enterprise-class servers.

HP will put them into six ProLiant server models: the DL145, DL385 and DL585 rack-based, density-optimized servers, and BL25p, BL35p and BL45p server blades.

HP also makes servers with Xeon-based processors from Intel. But in recent months, the market has consistently chosen AMD's Opteron.

"When we first delivered a single-core Opteron, it was faster for applications like databases, high-performance computing and Web applications. The single-core Xeon was still better for applications like file and print because it ran at higher clock speeds," Cumings says.

"Then AMD released the dual-core Opteron, and it was faster for pretty much any multithreaded application," he says.

HP also plans to upgrade its Intel-based servers as soon as the processor manufacturer releases its family of Dempsey and Woodcrest chips.

Those chips are built with Intel's Core Microarchitecture design, using a 65-nanometer die size to combine the energy efficiency of the company's Pentium M and Core Duo processors with the high performance of its Pentium 4 and Xeon products.

HP expects to roll those into seven ProLiant computers, from workstations to servers and blades. Intel says that, compared with the 2.8GHz Xeon, it expects Woodcrest to boost performance 80% while reducing power draw 35%. ■

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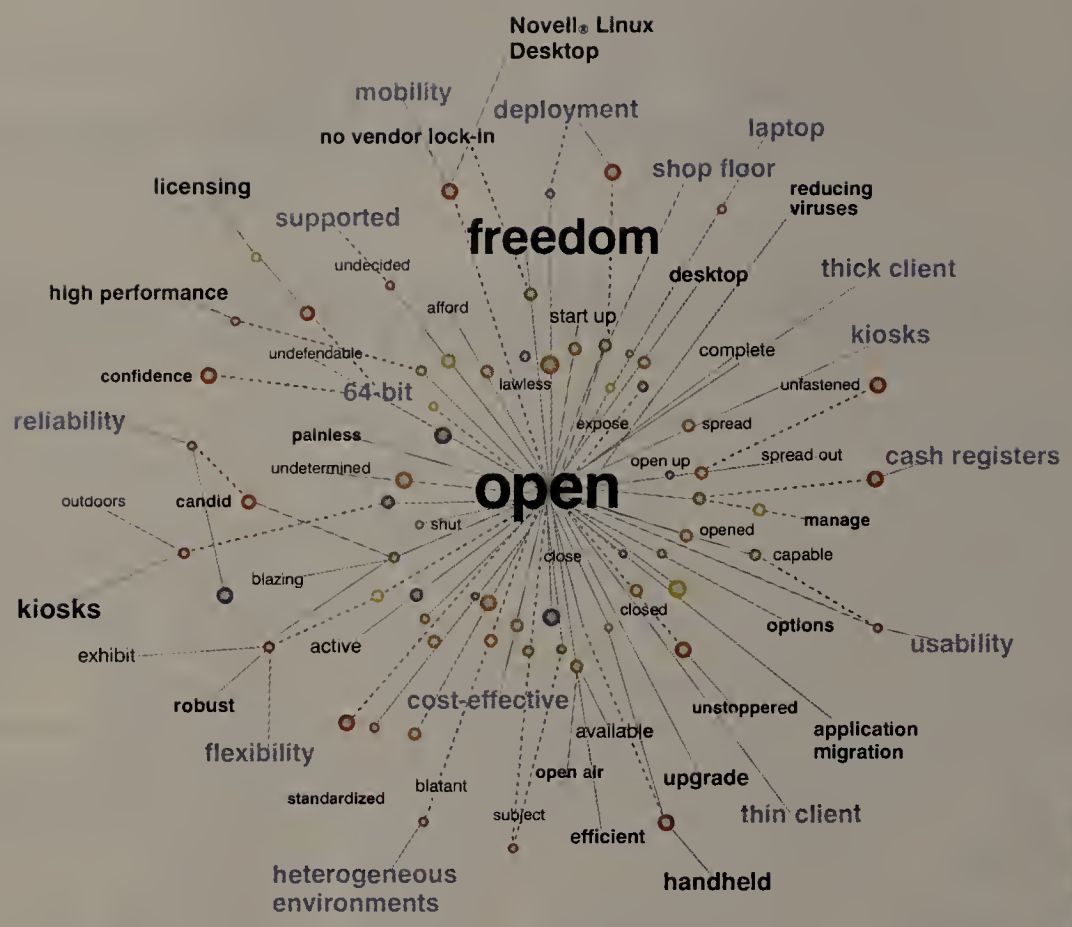

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Software cleanses sensitive documents

BY ANN BEDNARZ

The Center for Army Lessons Learned is on the receiving end of sensitive information that it sanitizes and turns into instructional materials for military personnel.

For Dan Cindrich, security specialist, the challenge is to make sure the documents that leave CALL don't inadvertently expose sensitive or extraneous information. For the last seven months he has been using software from SRS Technologies to help automate the task.

SRS makes Document Detective, an electronic document security tool rolled out last week. The software is designed to find and strip dozens of hidden data and metadata varieties, including tracked changes, comments, OLE files, embedded objects and object fragments.

The IT community knows about threats from hackers and malicious insiders, but they're less aware of the damage that can be done when employees share files via the Web and e-mail and inadvertently expose information, says Ron Hackett, a program manager at SRS and developer of Document Detective. "Ordinary users have tremendous access to information and a legitimate need to share some of that information outside of the security boundary. The problem is, the document formats they like to share information in can contain lots of hidden data," he says.

It's a problem that has caused a number of data leaks, particularly among government agencies. In May 2005, for example, Multi-National Force-Iraq posted a report regarding an investigation in Iraq, but the organization's attempts to mask certain sections failed. By cutting and pasting text that had been blacked out in the PDF file, viewers could see hidden words.

A key factor contributing to such data disclosures is an ad hoc review feature Microsoft added in Office XP that automatically enables version tracking if a user e-mails a document — even if version tracking wasn't turned on in the original document. "It's automatically enabled every time you e-mail a Word, PowerPoint or Excel document using Outlook," Hackett says.

Finding hidden data

The Center for Army Lessons Learned has scanned nearly 650 documents using SRS Technologies' Document Detective. It found information obscured by images in

75%

of the documents.

Microsoft has since changed this default setting, but some companies may still be vulnerable. "If you do a clean install of Office 03, that switch is turned off. But if you do an upgrade from Office XP, that switch is still turned on," Hackett says.

CALL, based in Fort Leavenworth, Kan., hopes to avoid any data-disclosure gaffes with Document Detective. It has used the software to scan and scrub nearly 650 documents. CALL found 75% of the documents had information obscured by images, 20% had hidden layered objects, and 5% had information embedded in metadata.

"It's given us greater confidence that our documents are completely in a pure form, that there's no accidental information in there," Cindrich says.

Document Detective is priced starting at $300 for a single-user license. The version available now is a desktop application that lets users initiate a document scan via a toolbar embedded in Word, PowerPoint and Excel documents.

SRS plans to develop a plug-in for Outlook that would let companies warn users that an attached document needs to be scanned before being sent outside a defined security domain. A server-based version also is in the works.

Other vendors in the document-scrubbing business include Workshare, which offers software for uncovering hidden data in Office documents, and Microsoft, which offers a free add-in for Office 2003/XP that removes hidden data. ■

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NET INSIDER
Scott Bradner

IETF: Not a teenager anymore

By the time you read this the 65th Internet Engineering Task Force (www.ietf.org) meeting in Dallas will be over. This meeting represents a milestone, as the IETF is now more than 20 years old. The IETF has been the major player in almost all important — and quite a few not so important — Internet and IP network technologies for the past two decades. Not bad for an activity that has never had any legal existence.

The first IETF meeting was held in San Diego on Jan. 16 and 17, 1986 (www.nwdocfinder.com/2723). Twenty-one people attended, four of whom are still very active in the task force. That meeting focused on some topics — including routing and QoS — that were discussed by 1,200 or so people during this year's Dallas meeting (www.nwdocfinder.com/2724).

The Internet has come a long way since that first IETF meeting. In 1986 the Internet did not exist for most of the population. At the time it was made up of two backbone networks, mostly for government research — the then-17-year-old ARPANet and the recently created National Science Foundation Network (NSFNet) — as well as a handful of regional research networks created along with the NSFNet.

For the most part, access to these networks was limited to researchers receiving federal funds. The number of Internet hosts would not pass 10,000 for another year. Today there are thousands of ISPs and there are IP networks in millions of enterprises and residences worldwide. And there are more than 350 million Internet hosts and close to 1 billion Internet users.

Since 1986 the IETF has developed or maintained all the core Internet protocols running "above the wire and below the application" (in the words of an old description of the task force's role). Attendees at the first IETF meeting were mostly from academic and research institutions. The attendees in Dallas this year will be mostly from corporations involved in Internet and IP network equipment or services.

For at least the last decade some pundits have been saying the best days of the IETF are over and the important new standardization activity will take place somewhere else. So far, these predictions of irrelevancy have proved false, because the IETF continues to develop technologies that become widely adopted in IP networks everywhere. Among the important technologies from the last decade are Enum, iCal, IPv6, iSCSI, Multi-purpose Internet Mail Extensions, MPLS and Session Initiation Protocol.

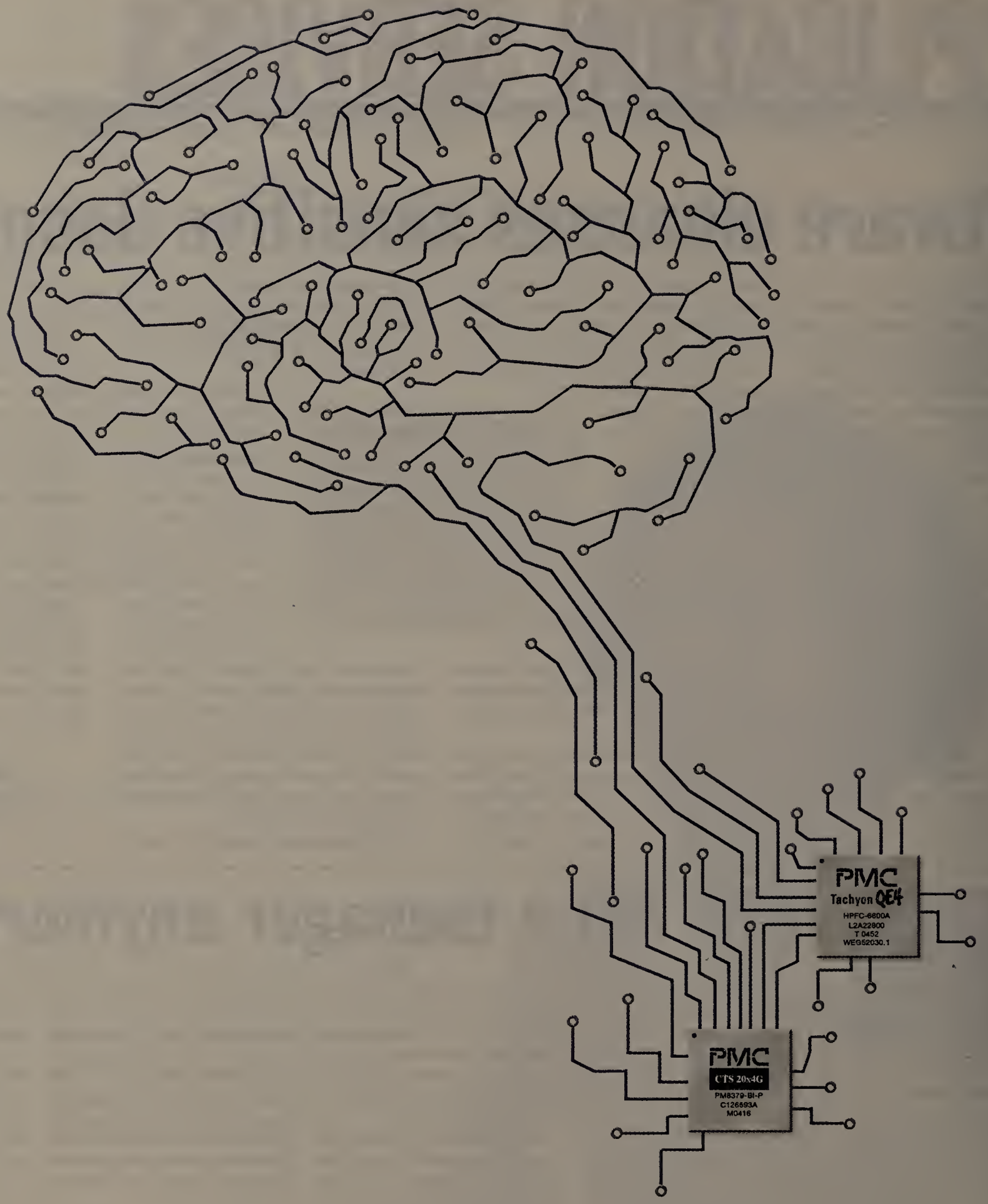
There are numerous protocols under development, as can be seen from the Dallas agenda (www.nwdocfinder.com/2725). Not all will wind up being accepted by the marketplace, but I expect many of them will be.

There are a few key features that make the IETF as important as it has been over the years. One is its mode of operating mostly on mailing lists; another is its openness. Anyone can participate in the IETF standardization process by joining a mailing list; there is no fee or membership agreement. Join, read the documents, which are open to all on the Web, and start participating. You do not have to spend money attending the face-to-face-meetings in order to participate effectively in standards development.

Time will tell if the IETF will be supplanted by other groups in the Internet standards biz, but there is currently no specific contender for the role.

Disclaimer: Some pundits have claimed Harvard's best days are behind it; I did not ask the university for an opinion on that idea or about the IETF, so the above birthday report is mine alone.

Bradner is a consultant with Harvard University's University Information Systems. He can be reached at sob@sobco.com.



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EYE ON THE CARRIER
Johna Till Johnson

Why Internet metaphors matter

You've heard a lot (including from this column) about topics such as net neutrality and universal broadband. Behind the buzzwords, there's a broader debate raging about how to characterize the Internet.

Listen closely to the metaphors that are invoked for certain arguments. Proponents of universal broadband see the Internet as a utility, like electricity or water. The image here is a vast grid that carries services from upstream reservoirs or power stations into homes and businesses. And these folks argue that the Internet has become as basic and vital as electricity and water, which means people need consistent and reliable (read: regulated) access.

Cable companies and carriers have a different view. They see the Internet as a giant broadcast network, with Web sites such as Google and Amazon providing content that gets piped into users' homes, just as television networks deliver "Law and Order" and "The Sopranos" to viewers. That's one reason for the carriers' position on net neutrality: If Google and Amazon are content providers for whom the Internet is a distribution mechanism, the carriers argue it stands to reason that content providers should pay for that distribution.

These metaphors have one thing in common: They position the 'Net as a way to connect users to content and services that live "out in the cloud." That's why providing connectivity to the Internet is usually called Internet access — the idea is that users are granted access to Internet services or content.

But that model of the Internet misses a major point. Unlike with the power, water and broadcast networks, Internet users are creating their own content and services, and relying on the Internet as an exchange mechanism — not merely a distribution network.

So I'd insist on calling it Internet connectivity to highlight the fact that the Internet isn't so much a pipe delivering someone else's content as a peer-to-peer link that lets you exchange your content and services with your neighbor.

Why does any of this matter? Two reasons. First, as I've mentioned in earlier columns, 2006 is a big year for policy changes affecting the Internet — and flawed metaphors make faulty policy.

A second reason is practical. Flawed metaphors lead to faulty service offerings. ISPs often offer Internet access services that filter certain ports and offer asymmetrical bandwidth (more on the downlink than the uplink), on the theory that a user is passively clicking on Web sites.

But what if that user is a programmer working from home developing code for a grid computing project? That requires symmetrical bandwidth, connectivity through all ports and high QoS.

Network managers who are crafting virtual worker policies for mobile and home workers need to be aware of the limitations of such access services, and also be realistic about the fact that true connectivity may cost more.

Johnson is president and chief research officer at Nemertes Research, an independent technology research firm. She can be reached at johna@nemertes.com.

Short Takes

■ **Sprint Nextel** announced last week that its local services division is launching a Wi-Fi municipal trial in Henderson, Nev., which is expected to run through the end of May. Sprint's local division will be renamed Embarq later this year when Sprint spins off this business as it previously announced. The Wi-Fi trial will be tested, free-of-charge, by city officials, businesses, consumers, and fire and police officials. Municipal Wi-Fi networks also are being planned by other providers in larger cities, including Chicago, Philadelphia and San Francisco.

■ **Sprint Nextel** has filed a third lawsuit against companies allegedly selling the mobile phone records of its customers. In the complaint, Sprint Nextel accuses San Marco & Associates of St. Petersburg, Fla., of using fraudulent tactics such as pretexting, the practice of obtaining personal information under false pretenses, to access mobile phone logs and phone numbers.

Usage-based pricing is a catchy tune

BY CAROLYN DUFFY MARSAN

Equant has outmaneuvered MCI and Sprint to win a five-year, multimillion network outsourcing deal from Universal Music Group, thanks to the ISP's usage-based pricing approach.

UMG previously managed its own IP network, which spans 48 countries and has 9,500 users. UMG, one of the world's leading music companies, decided to outsource its network operations two years ago and ran a competitive procurement to select a managed services provider.

This month it selected Equant to operate its entire communications infrastructure, including global WAN and LAN, data and voice services, as well as mobility and Web hosting.

Equant officials say the UMG deal was significant because it is one of the ISP's first successes with utility-based pricing.

"We offered utility and usage-based pricing on the WAN, LAN and for VoIP," says Gene Chao, senior vice president of outsourcing for the Americas at Equant. "We won them over with ... the way we financially engineered our approach."

Scott Belmont, executive vice president and CIO at UMG, says he hopes to save 10% to 20% of his annual network operations budget as the result of Equant's usage-based pricing. UMG spends $20 million a year on its communications infrastructure.

"Overall, we're looking at savings in the low double digits, under 20%," Belmont says. "It's the result of the combination of usage-based pricing and not being saddled with fixed investments on our balance sheet."

Belmont says Equant's usage-based pricing was very significant in UMG's award of the contract.

"This offers the kind of flexing of network capacity that we need," Belmont says. "We have a lot of pretty heavy digital content being passed around all of our countries... .Our usage varies depending on the time of the year and where we might be releasing [music] geographically."

As part of the deal, Equant will migrate UMG to an MPLS-based IP VPN, which will offer converged voice, data and video services. Equant also will provide its Business Everywhere suite of remote access solutions.

"The most important part of this deal is around how we are going to be doing the invoices," Chao says. "Traditionally, companies buy bandwidth. But this deal is much different. It's usage-based for the data network and voice. We will take a look at the applications that run over the network and scale the bandwidth on the back end to support those applications."

Equant's usage-based pricing is available globally for IP data and voice services. It says the pricing is designed for companies that use variable amounts of bandwidth, such as music and entertainment businesses that see a spike in traffic with the release of new albums or movies.

Usage-based pricing is ideal "if an organization is dynamic, either opening or closing offices, or has a business model that needs a lot of flex to it," Belmont says. "Fast-food chains that are multiplying might find this useful. Whereas, if you have really static traffic this is not something you need."

Equant hired 15 members of UMG's network management staff as part of the outsourcing deal, which will replace several dozen network contracts that UMG previously administered itself. ■

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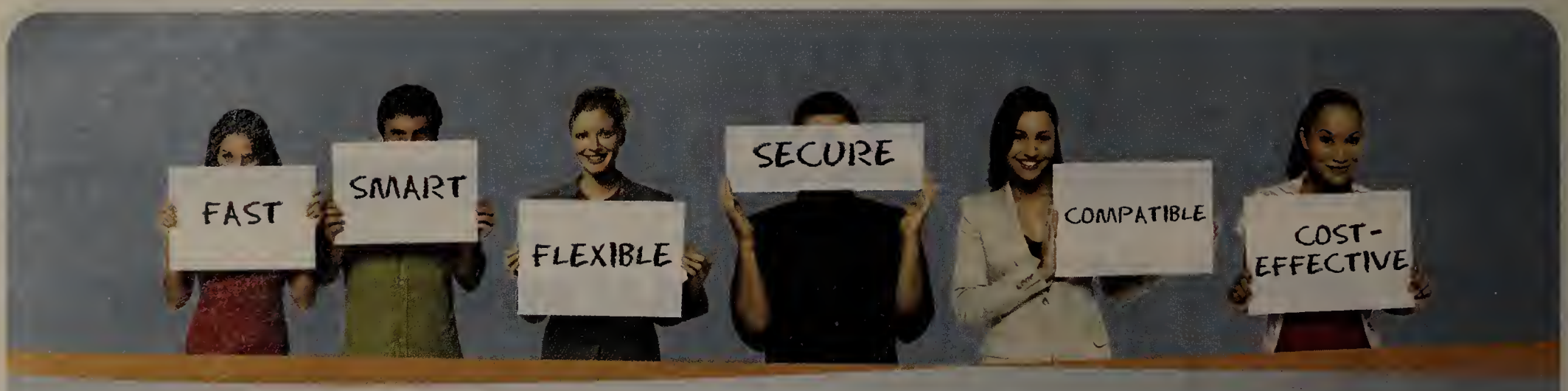

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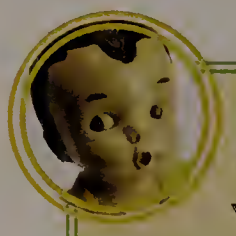

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TECHNOLOGY UPDATE

AN INSIDE LOOK AT TECHNOLOGIES AND STANDARDS

SyncML links communications devices

BY JON NEWMAN

Today's users have an ever-expanding array of personal communications options, including devices such as mobile phones, PDAs and PCs, and a growing number of new services, such as VoIP and instant messaging, on top of traditional e-mail. As a result, there is an increasing need for synchronization of contacts, calendars and to-do lists across multiple applications and devices. Managing personal data across devices is time-consuming and complex, and users need a good way to ensure that information is available wherever and whenever they need it.

Synchronization Markup Language (SyncML), also known as data synchronization and device management, is a platform-agnostic synchronization standard from the Open Mobile Alliance that enables information stored on network servers and multiple user devices to be easily and automatically synchronized. For example, users could add a contact to a mobile phone during a business meeting, synchronize with a network and instantly have that contact available on their desktop e-mail client and PDA and via the Web.

Leading mobile phones support SyncML. These phones can be used, along with SyncML servers and SyncML desktop clients, to synchronize data on a network and multiple applications and devices. The current version, SyncML 1.2, provides server-initiated synchronization, which enables new personal information to be synchronized to a mobile device without prompting from a user or device client.

The SyncML standard works via the SyncML representation protocol and SyncML synchronization protocol.

The SyncML representation protocol defines a standard format for SyncML messages in an XML document. The body of the document contains one or more SyncML commands, defined by a set of request commands and a set of response commands.

The SyncML synchronization protocol defines actions between a SyncML client and a SyncML server. Features include synchronization anchors that represent the current and last synchronization event and let a fresh synchronization occur if they don't match, and ID mapping that utilizes locally unique IDs and globally unique IDs for each data item in the client and server.

Other capabilities of SyncML include security, addressing schemes and the presentation of information about the capabilities of the device to be synchronized. In addition, there are seven synchronization types supported, of which three are key:

- Two-way synchronization, which allows new changes to be exchanged between client and server.
- Slow synchronization, which enables all items in client and server databases to be compared field by field.
- Server-alerted synchronization, which notifies a mobile device when an update occurs on the network, to prompt a new synchronization session.

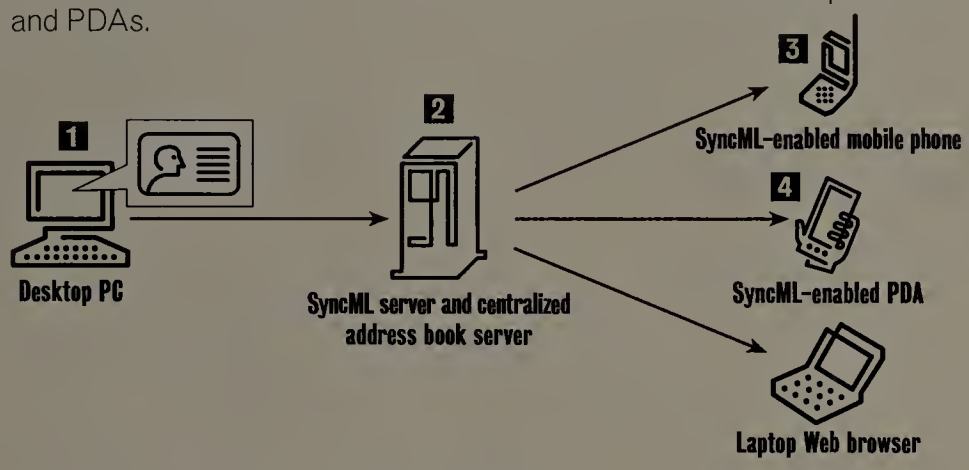
SyncML can be implemented in a variety of applications and devices. It can be used by developers at a company or by application vendors to create SyncML clients and servers. Different transport bindings can be used to allow for use with different systems, such as HTTP and Object Exchange for infrared. SyncML is built on existing Internet and Web technologies, and has been optimized for wireless networks and mobile devices, addressing the issues of high network latency and limited bandwidth with features such as a single request-response message model and Wireless Application Protocol Binary XML to reduce the size of messages.

Any data format can be synchronized using SyncML, including files, thus making a broad range of content available to users via their mobile phones, PDAs or PCs.

Newman is a product manager for Critical Path. He can be reached at jon.newman@criticalpath.net.

HOW IT WORKS: SyncML

Synchronization Markup Language (SyncML) is a standard for synchronizing information between servers and user devices such as mobile phones and PDAs.



1. A user adds a new contact to a desktop PC's address book.
2. Using SyncML, the desktop client is automatically synchronized with the SyncML server and the centralized address book server.
3. On receiving the update, the SyncML server triggers an automatic sync session with the user's mobile phone. The new contact information entered on the desktop PC is available instantly on the phone.
4. PDAs and other devices are easily updated with the new contact when they are synchronized with the server. Additionally, the contact information can be accessed from any Web browser by simply connecting with the server via its Web interface.

Ask Dr. Internet

By Steve Blass

I am running a network of hundreds of computers with Windows XP Pro clients and Windows 2000 Server for the domain. I would like to set up a network administrator account to be able to install software on local client machines. Is there a way to do this so that I can just log on using an admin account I create on the domain and be able to install the software?

You can grant local administrator privileges to a domain account by adding that domain account to the administrators group on the local machine. Creating a group in the domain containing the domain accounts that are allowed to administer machines, and adding that domain group name to the local administrators group on each machine, lets you change the local administrators group on every machine simply by updating the one domain security group entry. You will need to install the Adminpak.MSI package, available on your server CD or from Microsoft (www.nwdocfinder.com/2726), on your workstation if you have not already done so. Use the Active Directory Users and Computers application found under Administrative Tools in the control panel to create a new universal security group and add your trusted administrator accounts to the group. Add this group to the local admin group on machines as you roll them out or as you perform maintenance. Once the local admin group contains the domain admin group, domain admins can perform local administrative tasks.

Blass, a network architect at Change@Work in Houston, can be reached at dr.internet@changeatwork.com.

GEARHEAD
INSIDE THE NETWORK MACHINE

Mark Gibbs

OQO, outstanding and disappointing

Over the last few years Apple raised the bar for cool product design and, in our unhumble opinion, few companies manage to get anywhere close. But a product we've had in our hot, sweaty hands for a few days is a great example of outstanding engineering that approaches Apple's design quality, but just misses.

The product is OQO's eponymous OQO Model 01+ — the company and computer with the unpronounceable name.

The OQO is undeniably cool. Despite being the size of a PDA (4.9 by 3.4 by 0.9 inches) and weighing 14 ounces (somewhat heftier than most PDAs), the OQO is a complete PC with a pen interface capable of running Windows XP Home, Professional or Tablet editions.

The OQO comes with a 1GHz Transmeta Crusoe processor, 512MB of DDR RAM and a 30GB shock-mounted hard drive with auto-parking when free fall (as in being dropped) is detected. (We doubt how well the OQO would stand even moderate abuse.)

A slick feature of the OQO is the screen (a 5-inch, 800-by-480-pixel W-VGA transflective display, which is reasonably readable outdoors) that slides up to reveal a full, albeit miniature, qwerty keyboard with a TrackStik (a mouse controller). There's also a well-designed thumbwheel on the side of the OQO that provides vertical and horizontal scroll for applications as well as volume control.

Another neat design feature: The keyboard uses sticky Function, Control and Alt keys — press one once and it's combined with the next key you press, press twice and it's locked on, press a third time to unstick it.

The OQO's input and output features are remarkable for such a small package and include 802.11b wireless support, Bluetooth, a four-pin FireWire port, a miniature

Despite being the size of a PDA . . . the OQO is a complete PC.

USB 2.0 port, a 3.5mm stereo headphone jack, a microphone and a speaker.

The removable but not hot-swappable lithium polymer battery is supposed to have three hours of life, but we got only about two and half hours out of it.

The OQO comes with a docking cable that provides a 1,280-by-1,024-pixel VGA video output, another USB port and another FireWire port, an Ethernet connection, audio out and DC power input. A simple stand also is included, but it isn't stable enough, particularly when the docking cable is connected.

The OQO kit includes a protective carrying sleeve and a universal power supply with aircraft and automobile adapters. Optional accessories are a metal carrying case and a belt-clip carrying case.

So, you may be wondering, what is the OQO for? Well, we're not sure. If you are traveling giving PowerPoint shows, the OQO is probably the ultimate presentation device (and you will get points for style), although it can't drive the internal and external displays simultaneously to create an extended desktop.

As a desktop machine (using an external monitor, obviously) its performance — while OK — is limited by the Transmeta processor and half-gig of memory. But for the likes of senior executives who want to shuttle between home and the office, the OQO might well be a tempting package.

It falls down as a tablet computer or PDA, however. Because of the high-resolution screen and small physical size, combined with a very sensitive pen position-detection system, it is tricky to move the mouse to exactly where you want it, and the OQO is slow to respond to things like menu opening.

Windows Tablet Edition also doesn't help; at the OQO's resolution it doesn't provide a great user interface.

Finally, the OQO uses a soft screen material that is uncomfortable to write on — it feels like you're writing on jelly.

The OQO is an outstanding piece of engineering but is a pricey $2,000 considering its performance and the fact that its physical user interface doesn't live up to what we'd expect. That said, your CXOs will want one. It is that cool.

Interface with Gearhead at gearhead@gibbs.com or online at Gibbsblog.

CoolTools

Quick takes on high-tech toys. **Keith Shaw**

The scoop: Sierra Wireless AirCard 860 with Cingular Edge wireless service, about $100 (after $100 rebate and with two-year agreement).

What it is: A PC card that connects to a laptop to give you access to Cingular's 3G Universal Mobil Telecommunication System/High-Speed Downlink Packet Access (UMTS/HSDPA) network, which offers average downlink speeds of between 400K and 700Kbps. If you aren't in the zone of Cingular's UMTS/HSDPA network, the card drops back to Edge speeds, which average between 70K and 135Kbps. The AirCard comes with Cingular Communication Manager software, which lets you connect to the high-speed wireless network; it also can connect to any nearby Wi-Fi network if your laptop has an internal Wi-Fi module.

One Sierra Wireless AirCard plus one Cingular Edge service plan equals 3G download speeds.

Why it's cool: The main appeal of the AirCard is to obtain Internet connections in locations where other high-speed broadband options (such as wired or Wi-Fi) don't exist. Instead of hunting around for a hot spot, the card gives you high-speed wireless access so you can download e-mail, Web surf and even connect to your corporate network (the software supports VPN connections). Installation and operation of the card and software were extremely easy — I was up and running in minutes.

Performance anxiety: To figure out my relative speeds with the AirCard compared with other network options, I tried two tests. To test my Internet speed, I ran tests at the Toast.net Web site's Internet Speed Test (http://performance.toast.net). I also used Ipswitch's WS PingPro software to run throughput tests between my system and the Yahoo.com domain. Numbers provided by each tests were not equal, suggesting a different route and measurement method (the Toast.net site measures how long it takes to download a text and image file and calculates the speed, while the PingPro sends IP packets to a remote host and calculates the average kilobytes sent over the link per second). I tested the AirCard in three locations (Southborough, Mass.; Millbury, Mass.; and Las Vegas) and got three different results, meaning your performance will vary greatly depending on location, signal strength and whether you're connected to Cingular's Edge or HSDPA network.

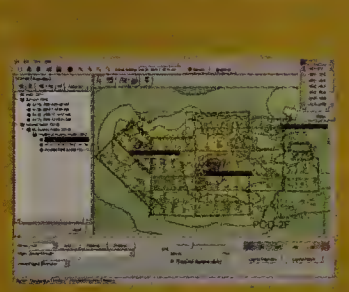
The results: For Test 1 (Southborough) we averaged 1.935Mbps with the Toast.net tests and 33.93Kbps with the PingPro tests. Test 2 (Millbury) produced speeds of 188Kbps with Toast.net and 14.32Kbps with PingPro. Test 3 (Las Vegas) netted a 2.36Mbps average with Toast.net and 26.04Kbps with PingPro.

Analysis: When I tested the AirCard in Las Vegas I noticed the signal had a 3G logo when connected, which suggested I was on the HSDPA network. I didn't see this in Millbury, which suggests I was on the Edge network. I forgot whether I was on HSDPA in Southborough, but the numbers suggest I was. The tests suggest great downlink speeds (if you believe the Toast.net numbers). If other connections are available, however, the AirCard's speeds don't stack up. For example, in Southborough I also had access to a wired connection, and got a PingPro average of 559.35Kbps, about 16 times the speed of the Cingular connection. Similarly, a cable broadband connection in Millbury produced a 3.718Mbps connection with Toast.net, about 19 times the speed of the Cingular connection. So, it appears that the AirCard works best when other high-speed options aren't available. In Las Vegas I briefly accessed a Wi-Fi signal from an unprotected access point, and its performance wasn't as good as the AirCard's.

Grade: ★★★★ (out of five)

Shaw can be reached at kshaw@nww.com.

Complete network visibility. Because nothing's more frustrating than the phrase "Hey, I'll bring in my wireless router from home."



Introducing InterpretAir™ WLAN Survey and EtherScope™ Wireless Network Assistant — everything you need to plan, install, troubleshoot and manage your network. An efficient, secure and effective wireless network doesn't just happen. It requires a good deal of pre-deployment planning, careful installation, effective troubleshooting and prudent management. That's why we offer two powerful products. InterpretAir software reduces overall deployment cost by carefully mapping optimal access point placement using graphical site maps. As for EtherScope Wireless, it's the first 802.11 a/b/g wireless and gigabit wired-side analysis tool that's compact and easy to carry with you. Two network tools that are not only indispensable for planning and deployment, but for spotting security risks, too. Including those created both innocently and not-so-innocently.

To learn more about these products and visit our Wireless Lifecycle Management Solution Center, go to www.flukenetworks.com/wireless.

FLUKE networks

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NETWORKWORLD 20th ANNIVERSARY

The long view

Headlines from early issues of *Network World,* which we launched 20 years ago this month, touch on everything from broadband LANs to MS DOS 3.1 and the Open Systems Interconnect model.

Back then, buyers were scrambling to bust computing out of the glass house and extend the functionality to workers. The efforts resulted in a litany of connectivity problems and issues, not the least of which involved establishing simple physical connections between environments.

We have come a long way, but in many ways the overarching goal remains the same: integration. It is just that the problem has moved up the stack. Today everything is connected, but we still largely operate silos. The new emphasis is on integrating applications and data, and the Holy Grail is prying the resources free of the underlying infrastructure and delivering them as needed in the configuration appropriate for the new work at hand.

Realizing that vision will truly make the network the computer, we plan to be there to chronicle the change. Technologies come and go, but *Network World* has strived over the years to focus on the constants: delivering product and service analysis to help network leaders make informed technology business decisions, and outlining ways to apply technology to advance business needs.

Here's to the next 20.

— John Dix
Editor in chief
jdix@nww.com

20-20-20: A compilation of change in three acts

- 20 products that changed the industry.
- 20 people who changed the industry.
- 20 most important *Network World* stories.

Page 31

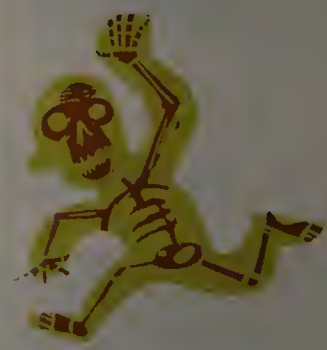
Then and now: $20 buys you ...

Well, let's just say one heck of a lot more. **Page 38**

COVER ILLUSTRATION BY 9 SURF STUDIOS

20 years in networking

Are you better off today? What was your best tech decision? Your worst? Readers weigh in. **Page 48**



Giga flops ▲

Let's not forget the failures. Developments chronicled — OK, hyped — in *Network World* over the past 20 years. **Page 50**

◄ Router man

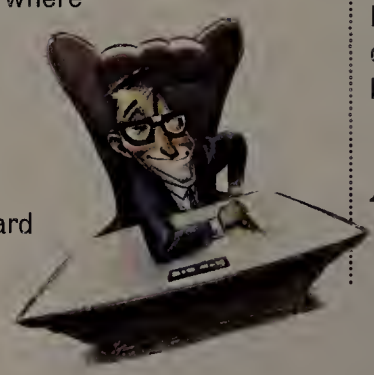
Don't be fooled by the Cisco fable. This is the guy who started it all. **Page 39**

A special nod of thanks

Al Gore, Bob Metcalfe, Ray Noorda, where would we be without you? **Page 44**

New pay, new responsibilities ►

Net executives' salaries rocket upward as stature grows. **Page 46**



Are you a net know-it-all?

Challenge yourself with this collection of questions about interesting technologies, companies and personalities of the past 20 years. **Page 52**

Future shock ►

Enough with the past. We ask five futurists to describe the future coming our way. **Page 54**

Advice for the next gen

How should today's IT students prepare for the next 20 years? **Page 58**

History lessons

A brief timeline of network industry milestones.

ILLUSTRATIONS BY BARRY BLITT

January 2006 The three leading wireless carriers rolling out 3G networks supporting data rates from 400K to 700Kbps.

March 2006 AT&T announces plans to buy BellSouth for $67 billion.

2006

February 2006 Western Union sends final telegram after 150 years in the business. At its peak in 1929, it sent some 220 million telegrams. In 2005 it sent about 20,000.

20-20-20 hindsight

Looking back at the network industry's most important people, products and stories of the last 20 years.

▶ 20 people who changed the industry

BY BETH SCHULTZ

Reflecting on two decades of tech development and trying to identify 20 of the most influential players is tough, but we skimmed the cream with the help of longtime industry watchers. The result: a list of technologists, savvy business leaders and forward-looking IT executives who made a difference.

NETWORK INFRASTRUCTURE

Len Bosack and Sandy Lerner: *Cross-campus Internet workers.*

They might not have invented the router, as is often believed (see Q&A, page 39), but the two Stanford University employees built one heck of a company to exploit it.

The two recognized the multiprotocol router's commercial potential and founded Cisco in late 1984; when they left in 1990 (Lerner was forced out, and Bosack left of his own volition immediately thereafter), the company had grown from an unknown, four-employee start-up to a 250-person, publicly traded industry trendsetter with a market cap of $224 million. Today Cisco remains the router leader, as well as a dominant player in the access, switch, security, storage, VoIP and wireless markets. That market cap? It had grown to more than $120 billion as of late last month.

Desh Deshpande: *Framed the future.*

Deshpande launched a data-services revolution in 1991 when he founded switch maker Cascade Communications and propelled the concept of frame relay into the industry's

consciousness. Cascade quickly became a dominant network vendor, growing from a one-person start-up to a $500 million company with 900 employees that Ascend Communications acquired in 1997 for $3.7 billion. Thanks in large part to Deshpande's efforts, frame relay has proven to be one of the most successful data services ever, the longtime de facto data communications standard for enterprise networks. After selling Cascade, Deshpande co-founded Sycamore Networks in 1998. Ever the entrepreneur and always the revolutionary, Deshpande this time brought the concept of intelligent optical switching to the foreground.

Bob Metcalfe: *Talk about a legacy.*

As a young engineer at Xerox PARC in 1973, Metcalfe invented Ethernet. Little did anyone know the technology, meant to connect local computers, would become synonymous with networking. There's no end in sight for Ethernet's dominance. Now operating at gigabit-plus speeds, it's a

choice for even local, metropolitan and wide-area networks. Since his early days at PARC and then at 3Com, which he founded in 1979, Metcalfe has been one of the industry's preeminent visionaries. He continues in that role today, helping develop upstart technology companies for Polaris Venture Partners.

Ray Noorda: *LAN man.*

Noorda took over the helm of struggling Novell in 1982 and in the process of resurrecting the company created the market for network operating systems. His insistence that engineers figure out a way to turn a bunch of disparate PCs into a networked entity turned Novell into the go-to LAN software vendor for years. Noorda's insight — that getting LAN technology entrenched in corporate America would require teams of highly trained and certified individuals — spawned reseller and certification programs still widely imitated today.

Radia Perlman: *No path uncovered.*

Though a prolific inventor to this day, Perlman is perhaps best known for her seminal routing work of the 1980s. Her spanning tree algorithm, a network staple, made robust, scalable networking a reality. A much-respected educator and collaborator, Perlman today still specializes in sophisticated routing protocols and network security as a distinguished engineer at Sun.

Yakov Rekhter: *Today's transport king.*

MPLS has come of age, with carriers and large enter-

January 2005 Ford cuts cord on 8,000 phones, replaces them with cell phones.

February 2005 SBC announces historic $16 billion acquisition of industry icon AT&T; later in the month Verizon announces it will scoop up MCI.

December 2005 AOL blocks 1.5 billion spam messages daily, from 2 billion to 2.5 billion in 2003 and 2004.

2005

February 2005 Web services take off, as 64% of survey respondents say they have deployed at least the foundation technology.

March 2005 Firefox open source browser stealing market share from Microsoft, with 25 million downloads in fewer than 100 days on the market.

March 2005 Cisco acquires rival wireless switch maker Airespace for $450 million to address the fat vs. thin access-point argument.

prises adopting the protocol in their next-generation networks. Rekhter is known as the father of MPLS, though others, such as renowned routing expert Tony Li, worked on the protocol. Rekhter, who is now a distinguished engineer at Juniper Networks, has several other essential protocols to his credit as well, including the ubiquitous Border Gateway Protocol.

THE INTERNET

Mark Andreessen: *Internet revolutionary.*

In 1993, while studying at the University of Illinois and working part time for the National Center for Supercomputing Applications, Andreessen and colleague Eric Bina created a user-friendly, graphical browser. Its first version, NCSA Mosaic for X Window System, was so wildly popular among peers — who had been used to plain text browsers — that the duo quickly created Mosaic browsers for non-Unix systems. Andreessen went on to develop a commercial version, initially called Mosaic Netscape — and the rest is history. Andreessen continues to think big as chairman of Opsware, the data-center automation company he co-founded as Loudcloud in 1999.

Tim Berners-Lee: *Weaving the Web.*

Berners-Lee dreamed of a universal, easy-to-use information system and forever changed the way people network with his revolutionary World Wide Web. He continues to influence Web standardization and development as director of the World Wide Web Consortium.

Vint Cerf: *Net weaver.*

Cerf is widely hailed for his role in defining protocols that made it possible to stitch together stand-alone research networks to form the ARPANet, the precursor of today's Internet. In particular, we have him and fellow pioneering pals like Bob Kahn to thank for the now-ubiquitous IP. Today Cerf is tinkering with IP at the application layer in his position as chief Internet evangelist at Google.

Jon Postel: *Orchestrating Internet standards.*

Postel was another of the many quiet powerhouses behind the early Internet. He's credited with creating a clear, concise template for Internet standards and maintaining that set of unified standards documents. As *Network World* columnist Jim Kobielus notes, "He was the maestro who coordinated the development of many of the most fundamental open standards, without which the Internet and World Wide Web would never have risen so fast and spread so wide." Postel died in 1998 at the age of 55.

COMPUTING INFRASTRUCTURE

Laurie Bride: *Open systems pioneer.*

As an enterprise architect at Boeing throughout the '80s and '90s, Bride had the industry's ear regarding the need to interconnect disparate computing systems. Much of early open systems work traces back to Bride, who authored the TOP portion of the Manufacturing Automation Protocol/Technical Office Protocol and actively worked on and demonstrated the Open Systems Interconnection model and TCP/IP.

Bill Gates: *Opening windows the world over.*

Since forging and then ditching his OS/2 partnership with IBM many years ago, Gates has been profoundly influencing the way enterprises develop, deploy and use software. Some might not appreciate his business tactics, but you usually don't get to deliver on your vision by being the nice guy.

Lou Gerstner: *Leading the way to global services.*

Although not a technologist by training, this former RJR Nabisco executive left his mark on the industry by realizing sooner than others the importance of services, open standards, the Internet, e-business and Linux, and helped usher in the age of flexible computing and services-oriented architecture development. With that vision, Gerstner turned the lumbering blue giant he ran from 1993 through 2002 into the powerhouse it is today.

Linus Torvalds: *Open source's hero.*

The open source movement is strong and growing, more so with each passing day, thanks in large part to Torvalds, who published his Linux kernel in 1991 while a university student in Helsinki. Today Torvalds works at the Open Source Development Labs to maintain Linux and accelerate its enterprise adoption.

Scott McNealy: *Changing mind-sets.*

Preaching "the network is the computer" gospel, McNealy opened minds to the idea of the networked environment and seamless connectivity in the late '80s and early '90s. To follow that, in 1995 McNealy took the industry in a new direction — to the write once/run everywhere world of Java.

TELECOM

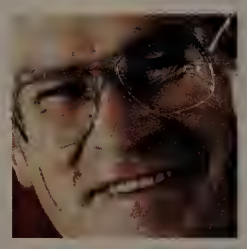
Phil Evans: *User advocate.*

Evans, a president and longtime board member of the International Communications Association, helped shape the telecom industry in the post divestiture era. Widely respected as a network visionary, Evans influenced a generation of telecom and data communications managers in spearheading the ICA's educational efforts in an age of telecom services such as ISDN and frame relay. Evans crafted telecom strategies at a variety of Fortune 500 companies, including Ashland Oil, Dresser Industries, FMC and Occidental Petroleum. He also co-wrote *The Network Manager's Handbook*.

Harold Greene: *Dictated change.*

With his infamous 1984 Modified Final Judgment, this federal judge broke up the Bell System and forever changed the telecom industry. He expected competitive local and long-distance service to blossom if AT&T were a long-distance carrier and local services were left to seven regional holding companies. In reality, his decision led to regulatory and legislative wrangling that continues today. One has to wonder what Greene, who died in 2000, would make of today's market in general and the new AT&T in particular.

Ed Whitacre: *Telecom's biggest gun.*



Last year Whitacre brought the Bell System breakup full circle when he led SBC's acquisition of AT&T. The move was only natural for the tough-minded, savvy executive who has been reshaping telecom boundaries for years by acquiring fellow regional Bells Pacific Telesis and Ameritech. Now he's at it again, with AT&T's proposed acquisition of BellSouth.

SECURITY

Shlomo Kramer: *Father of the firewall.*

Wherever there's an enterprise network, firewalls stand guard at its entry points. Some may argue that a garden-variety firewall no longer provides enough enterprise protection, but no one can deny how significant the technology has been for corporate security during the last decade. Kramer and his compadres at Check Point, including CEO Gil Schwed, get credit for inventing the firewall, and Bell researchers Bill Cheswick and Steve Bellovin get the nod for educating the masses in their widely read *Firewalls and Internet Security: Repelling the Wily Hacker*.

Taher Elgamal: *Encryption go-to guy.*

The world of data is a more secure place thanks to Elgamal. While chief scientist at Netscape in the late '90s, this encryption guru pioneered the SSL protocol that is a primary security mechanism for extended enterprises and the Web. Before that, he oversaw the engineering team at RSA Security that developed the industry-standard RSA cryptographic tool kits. He now serves as CTO of Securify, an application-layer security company he founded.

February 2004 Sun and HP expand their server families with boxes promising 64-bit capabilities at 32-bit system prices.

March 2004 Novell NetWare 6.5 will be the last network operating system carrying that brand name.

April 2004 MCI exits Chapter 11, seeks fresh start.

May 2004 Phishing arrives; everyone scrambles. "What's at stake is all of e-commerce and our online way of life," says Fred Felman, a vice president with Zone Labs.

June 2004 Compliance is driving costs through the roof; 60% of survey respondents say ensuring compliance with regulations is "extremely important."

2004

August 2004 Gates' famous security speech to financial analysts: Projects in development will transform security "from a concern for us into something that's a significant . . . business opportunity."

▶ 20 network-changing products in 20 years

BY CHRISTINE BURNS

Hindsight is indeed 20/20. Even though we didn't build the products that have changed the way networks do business in the last 20 years, our birds'-eye view of those developments gives us a license to pinpoint which 20 products have had the most impact on the network industry.

When we solicited input from our Network World Lab Alliance members about which products should be noted, we amassed a list of more than 50 wares that helped bring us increased infrastructure speed, access to the brave new world of the Internet and applications beyond our wildest dreams. In whittling the list down to a mere 20, we may have missed products or technologies that you deem worthy. Join our online forum and argue the merits of your own top 20 (www.nwdocfinder.com/2721).

Now, let's move on to our list of products and technologies, in chronological order.

Product: Sniffer
Company: Network General
Date: 1986

While very expensive (in the $60,000-plus range), this product, in its original Compaq II portable incarnation, was the first easy-to-use network diagnostic tool. The company then shipped Sniffer Distributed in 1991 and has since produced versions that peer into Gigabit Ethernet, wireless networks and even into the applications riding over them.

Product: Notes
Company: Lotus (now IBM)
Year: 1989

As the first true commercial workgroup application, more than 35,000 copies of Lotus Notes 1.0 were sold during the first year it was on the market. The system requirements were either DOS 3.1 or OS/2 on the client and either DOS 3.1, 4.0 or OS/2 on the server.

Product: The World
Company: Software Tool & Die
Year: 1989

The World is reputed to be the oldest commercial ISP. This outfit was founded in Brookline, Mass., by current CEO Barry Shein to give interested public parties access to Usenet News.

Product: NetWare 3.x
Company: Novell
Year: 1989

This was the version of NetWare that improved network operating system administration for large numbers of client machines and significantly sped up NetWare adoption. It was also the version for which developers — via Network Loadable Modules — could tie other services such as anti-virus software and backup, database and Web servers into the network. With NetWare 4.x, Novell added its Novell Directory System to the base product in 1993 and then acknowledged the importance of the Internet when it picked up TCP/IP support as its primary network protocol in 1998, with the rollout of NetWare 5.x.

Product: WaveLAN family of wireless LAN products
Company: AT&T Network Systems (later became Lucent)
Year: 1990

Based on a draft standard that would later become IEEE 802.11, this first family of WLAN products comprised the WaveLAN PCMCIA network cards for notebook and portable computers; WaveLAN/ISA software for AT-bus desktop computers; WavePOINT wire-to-wire access point; WaveAROUND roaming software; WaveMONITOR site installation survey program; and WaveMODEM system to integrate WaveLAN technology into OEM products. Together they allowed folks to connect any machine anywhere and help propel wireless networking to the level of importance that the wired side already held. Lucent shipped a fully 802.11-compliant suite of WaveLAN products in April 1998.

Product: 10BaseT hubs
Company: Synoptics
Year: 1991

Synoptics' early work on 10Base-T devices freed the network industry from coax cable, transceivers and taps. It allowed networking to occur at decent speeds over common twisted-pair wiring. Synoptics went on to merge with Wellfleet to form Bay Networks, which was purchased by Nortel in 1998. Today, the overwhelming majority of networking to client PCs is done over further versions of 10Base-T, including 100Base-TX (two-pair 100Mbps Ethernet) and 1000Base-T versions (gigabit over twisted pairs).

Product: Linux
Company: Open source
Year: 1991

As the first completely open source operating system, it became the most dominant platform for innovative network products since Linus Torvalds released Version 0.02 of the Linux kernel. It might not be as pervasive on the desktop or server installation as people were expecting it to be by now, but it set the stage for Darwin/OS X, which rejuvenated Apple as another challenge to Microsoft's Windows-everywhere charge.

Product: EtherSwitch
Company: Kalpana
Year: 1991

Kalpana rolled out the first multi-port Ethernet switch and went on to invent EtherChannel, a technology that provides additional inter-switch bandwidth by running several links in parallel. Cisco in a 1994 acquisition scooped up Kalpana and it's technologies which then became the roots of the existing Catalyst line.

Product: Netscape Navigator and Spyglass Mosaic
Company: Netscape and the Spyglass
Year: 1993

These browsers were the first commercial GUIs and opened the Internet to users.

Product: Firewall-1
Company: Check Point
Year: 1994

Check Point's work in manageable, packet-filtering firewalls was groundbreaking. Furthermore, Check Point built partnerships with reliable hardware manufacturers like Nokia, which gave enterprise customers the confidence to buy and install Check Point firewalls throughout their networks.

Product: Windows 95
Companies: Microsoft
Date: 1995

As the first client OS to natively support Winsock (short

January 2003 Cisco enters storage market with a feature-rich, director-class switch that tests show delivers some of the best performance metrics ever recorded.

February 2003 MS-SQL Slammer worm wreaks havoc across the 'Net, blasting through a half-million vulnerable servers in a week.

March 2003 SCO Group slaps IBM with $1 billion intellectual-property lawsuit, alleging Big Blue tried to destroy the value of Unix to benefit IBM's Linux business.

February 2003 Standards-based 10G Ethernet switches arrive.

May 2003 A bevy of wireless LAN switch start-ups — Airespace, AirFlow, Aruba and Trapeze — charge out of the gates.

April 2003 RFID explodes on the scene, big players roll out ambitious plans. Just as quickly, things start to fall apart because of privacy concerns.

July 2003 Cisco and the Pentagon now behind IPv6, but it's still early and many aren't buying it.

June 2003 Three years after jilting the enterprise market, 3Com introduces a backbone switch built by Huawei Technologies.

Oct. 2003 Gartner declares IDS dead.

2003

for Windows Sockets) – a spec that defines how Windows machines should access network services, especially via TCP/IP – it literally killed about a dozen third-party TCP/IP stack suppliers and started millions down the road toward Internet connectivity.

Product: Apache Web server
Company: Open source
Year: 1995

Apache was the first free Web server available, and is currently deployed everywhere across the Internet serving content of all shapes and sizes.

Product: Cisco 2500 routers
Company: Cisco
Year: 1995

This series of IP routers is one of the best-selling products of all time because it hit the right combination of size, ease of use and price. This all-in-one router changed how most enterprises build networks.

Product: StarTac cell phone
Company: Motorola
Year: Mid-1990s

With its revolutionary clamshell design, Motorola made the cell phone something you could put in your pocket or clip to your belt so that you (and your workers) could always be available.

Product: M40 router
Company: Juniper Networks
Year: 1998

In the previous decade Cisco, with its early ISG routers, had successfully beaten bigger network competitors including 3Com, Proteon, Wellfleet and IBM's Networking Hardware Division. Numerous ISPs and large enterprises, however, saw Juniper as a welcome second source for routers — especially because the M40 was designed by Tony Li, the same routing architect who previously had built Cisco's flagship 12000 series routers.

Product: SendMail Switch
Company: SendMail
Year: 1998

Sendmail was key to the e-mail revolution because it was how everyone got up and running with e-mail communications over the Internet. Eric Allman wrote the original version of this open source mail-transfer agent while he was at the University of California at Berkeley in 1979. He stopped development on it in 1982, however, and didn't revisit it until 1990. In 1998 he founded SendMail to sell the software's first commercial version, the SendMail Switch.

Product: The Google Internet search engine
Company: Google
Year: 1998

This search engine began as a research project by two Stanford University Ph.D. students, Larry Page and Sergey Brin. It differed from previous search engines because it analyzed the links among Web sites to determine an individual site's importance. The theory is that Web pages having the most links from other highly relevant pages must be the most important pages associated with a search. Judging by Google's stock price and its ever-growing reach across this industry, the theory seems to have proven itself.

Product: Napster
Company: Napster
Year: 1999

In a number of legal and technological ways, Napster was the nuclear bomb that hit the network industry. Once peer-to-peer file sharing was highlighted by this music-sharing application, the genie was out of the bottle.

Product: Windows 2000 Server
Company: Microsoft
Year: 2000

It's debatable which version of server-side Windows changed networking landscape the most, but we felt it necessary to include Windows 2000 Server because it was a performance improvement over Microsoft's first-ever server operating system — Windows NT 3.51 — and it contained the Active Directory Service. Windows 2000 Server also has the dubious honor of being the target of 2001's Code Red worm, which homed in on the indexing services of Windows 2000 IIS.

Product: Skype
Company: Skype
Date: 2003

This proprietary peer-to-peer telephony application provided the first real quality VoIP product (did we mention it's free here?) that has built a cult following and spurred industry questions about why corporations can't move to convergence more quickly. Skype picked up both business clout and deep pockets when eBay bought the company in the fall of 2005.

► 20 most important stories of the last 20 years

BY NETWORK WORLD STAFF

The network industry has been shaped over the last 20 years by a series of remarkable technology advances and blockbuster business moves, and has been tested by more than its fair share of negative incidents.

2005
Goodbye and hello, AT&T.

One of the most famous companies in the history of business — AT&T — succumbed to drastic changes in the market and years of bad management calls and accepted SBC's $16 billion buyout bid. The consolation prize: AT&T's name got to live on as that of the combined company. And before you know it, AT&T started to put itself back together again, bidding $67 billion on BellSouth.

2003
Slammer lays down the hammer.

The MS-SQL Slammer worm wreaked havoc across the 'Net, blasting through an estimated half-million vulnerable servers in the span of a week and making its effects felt for months afterward. A JP Morgan Chase spokesman said at the time: "We shut down our online banking."

2002
Ebbers, WorldCom meltdown.

Bernie Ebbers resigned as CEO of WorldCom amid his questionable financial dealings and the company's collapse. MCI soon filed for bankruptcy protection, but later emerged and was bought by Verizon.

2000
E-commerce gets whacked.

Web attackers took down Yahoo, eBay, Amazon, CNN.com and E*Trade with massive denial-of-service attacks. Shortly afterward, a group of leading Internet companies congregated to come up with best practices for turning back such attacks.

1999
Microsoft's monopoly.

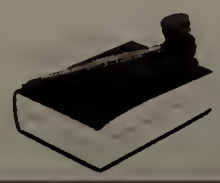
U.S. Judge Thomas Penfield Jackson ruled that Micro-

See 20 stories, page 36

March 2002 American Express hands over IT operations to IBM in an outsourcing deal valued at $4 billion.

May 2002 Early users laud arrival of 802.11a wireless LAN, which is much faster (54Mbps) than 11Mbps 802.11b LAN gear.

August 2002 Critics decry spread of scumware on the Web.



November 2002 Federal judge approves Microsoft antitrust settlement; it does not change dramatically the way the company does business.

2002

April 2002 Bernard Ebbers, WorldCom's embattled president and CEO, resigns.

July 2002 WorldCom files for bankruptcy following revelations of some $9 billion in accounting irregularities.

August 2002 Fall Interop in Atlanta succumbs to industry malaise.

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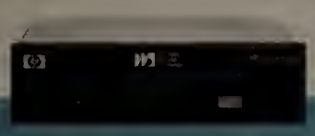

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20 stories
continued from page 34

soft is a monopoly, though three years later another judge approved a settlement that most agree did not dramatically change the way the company does business.

1999
IBM throws in the net towel.

The company, once a leading network equipment player, sold its switching and routing businesses to archrival Cisco.

1998
Netscape sells out.

Beaten down by Microsoft, Netscape gave up going it alone and agrees to a $4.2 billion buyout by AOL.

No more DEC.

Compaq paid $9.6 billion for the once-dominant minicomputer maker. Digital Equipment Corp. was divvied up among a number of companies, including Cabletron, Intel and Oracle.

1997
Cutting the cords with Wi-Fi.

The IEEE released the 802.11 standard, paving the way for real wireless LANs, plus hot spots, rogue access points and war driving.

1996
Reforming telecom.

Congress issued the Telecommunications Act of 1996, knocking down barriers in local and long-distance services, cable television and other markets. The eventual consolidation of the RBOCs and major interexchange carriers was never envisioned.

1995
IBM takes Notes.

IBM acquired messaging pioneer Lotus for $3.5 billion and went on to do battle with Microsoft in collaboration and e-mail software.

Microsoft discovers the Internet.

Bill Gates issues his famous "The Internet Tidal Wave" memo, formally recognizing the Web's potential a few years after many others did. Still, Microsoft was able to catch up in a hurry.

Ethernet everywhere.

The Fast Ethernet standard emerged, sending 100VG-AnyLAN, token ring and other technologies to the sideline and paving the way for Gigabit and 10Gbps Ethernet and forcing down prices.

1994
Pssst: GOSIP is dead.

After five years of development, the federal government pulled the plug on the Government Open Systems Interconnection Profile (GOSIP) and gave the nod to TCP/IP.

1991
Linux is born.

It took a while for most of us to catch on, but Linus Torvalds was on to something when he developed the Linux kernel at the University of Helsinki.

1990
OS/2 vs. Windows.

Microsoft and IBM split on OS/2 and Windows development. We all know who made out on that deal.

1989
Welcome to the Web.

Tim Berners-Lee of the European Practice Physics Lab proposed the World Wide Web, paving the way for Marc Andreessen and the rest.

1988
Hinsdale burns.

A fire in Illinois Bell's Hinsdale central office damaged most of the 50,000 circuits supported by the switch. The incident provided a wake-up call about disaster recovery at carriers and corporate IT shops.

SNMP keeps it simple.

The first RFCs for the network management protocol emerged, and SNMP went on to have a long and low-key career. CMIP anyone?

1986
E-mail gets connected.

MCI Mail and CompuServe linked their e-mail networks, marking the start of really useful messaging.

March 2001 Google hires former Novell CEO Eric Schmidt as its first CEO.

April 2001 Enterasys Networks announces industry's first prestandard 10 Gigabit Ethernet product.

September 2001 HP merges with Compaq.

September 2001 Kamikaze-style terrorist attacks on the World Trade Center and Pentagon test resiliency of Internet, telecom networks.

2001

April 2001 Department of Health and Human Services lets HIPAA health-privacy rules take effect, but promises change.

June 2001 Starbucks Coffee announces plans to roll out high-speed Internet access in all 4,000 of its North American shops.

Sept. 2001 Canadian teenager Mafiaboy sentenced to eight months detention for massive February 2000 distributed DoS attacks against e-commerce sites.

October 2001 Windows XP Professional ships.

Advertisement

MAXIMUM SYSTEM PERFORMANCE

Getting To The Bottom Of Common Reliability Problems

As an IT Professional, you know the importance of maintaining system performance and reliability. If the desktops or servers crash, slow down or freeze, who gets called? That's right...you or your IT staff. This "break-fix" cycle leaves you little time to be proactive. And yet, many of these issues stem from a single, hidden source.

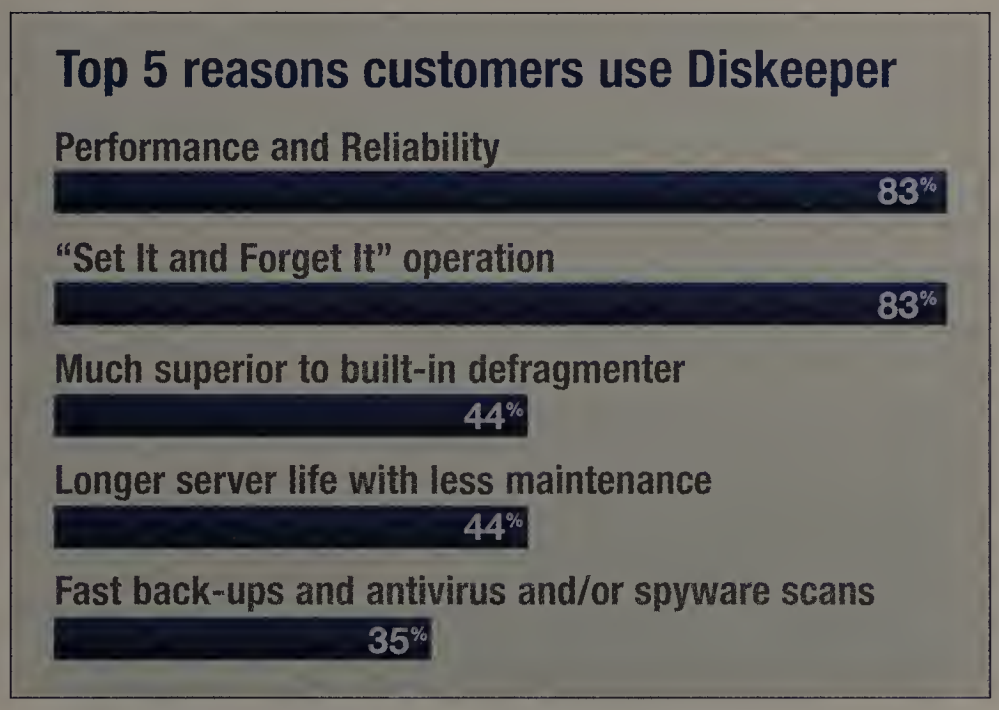
Reliability issues commonly traced to disk fragmentation.

The most common problems caused by file fragmentation are:

- ***Crashes and system hangs/freezes***
- ***Slow boot times and boot failures***
- ***Slow back up times and aborted backup***
- ***File corruption and data loss***
- ***Errors in programs***
- ***RAM use and cache issues***
- ***Hard drive failures***

Having files stored contiguously on the hard drive is a key factor in keeping a system stable and performing at peak efficiency. The moment a file is broken into pieces and scattered across a drive, it opens the door to a host of reliability issues. Even a small amount of fragmentation in your most used files can lead to crashes, conflicts and errors.

(GET THE PROOF HERE: www.diskeeper.com/paper)



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The weak link in today's computers

The disk drive is by far the slowest of the three main components of your computer: CPU, memory and disk. The fastest CPU in the world won't improve your system's performance if the drive is fragmented, because data from the disk simply can't be accessed quick enough.

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More than ever! Large disks, multimedia files, applications, operating systems, system updates, virus signatures – all dramatically increase the rate of fragmentation. If fragmentation is not addressed daily, system performance will suffer. Fragmentation increases the time to access files for all common system activities such as opening and closing Word documents, searching for emails, opening web pages and performing virus scans. To keep performance at peak, defragmentation must be done daily.

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In networking, your money goes a lot further these days

BY ADAM GAFFIN

Need a modem? Go down to CompUSA and for $20 ($19.99, actually), you can pick up a 56Kbps modem card that also can send and receive faxes. It's completely unremarkable (except perhaps for the question of why you'd even need a modem in this age of wireless access points and built-in Ethernet ports).

RAY VELLA

But set the time machine to 1986, when dinosaurs walked the Earth — and *Network World* started. Back then, Racal-Vedic's 9.6Kbps modem had a list price of $1,200; Fastcomm's $1,100. Or you could try your luck on a US Robotics Courier HST 9.6Kbps modem for only $750. Not fast enough? Telebyte offered a 19.2Kbps modem — at $3,500. 56Kbps? Hah! That's what WAN backbones used.

When it comes to network gear, Moore's Law seems to have done pretty well over the past 20 years — prices have tumbled even as performance has skyrocketed. To see by how much, we tried to compare what $20 would buy you today — and what it would have gotten you 20 years ago.

Today, for about $20, you can buy a 10/100Mbps network interface card (NIC) (if you really want to splurge, add another $10 for a 1Gbps model). In 1986? Forget about it! Digital sold the equivalent of an NIC for $500. Connecting Ethernet segments back then might run you $3,800 for a 5Mbps Ungermann-Bass repeater or $8,000 for a 10Mbps DEC LAN Bridge 100.

Applitek sold Ethernet bridges for $13,000 each (but they did packet filtering). Today, you can get a D-Link DWL-G810 108Mbps (wireless) Ethernet Bridge for $120 or so.

Storage is another network technology that has seen almost unbelievable changes. Today, $20 would buy you about 36GB of storage (based on a 250GB Western Digital hard drive recently advertised for $139 at CompUSA). In 1986, one Usenet post marveled that somebody was selling 71MB Micropolis hard drives (with retrieval times of 30 milliseconds) for $1,250 apiece. "I bought one before he was able to get sane, and I would recommend you do the same," the poster wrote. So if it were possible to divide that hard drive, for $20, you'd get a little more than 1MB of storage (which today wouldn't be enough to hold a single photo from your basic digital camera). For more permanent storage, you could buy an ISI optical-disk system, which used write-once CD-ROMs, for $3,000.

Of course, you'd want to attach that storage to a file server for your network. Today, Dell will sell you a 3.66GHz PowerEdge 6800 server for $15,360, or $4.20 per MHz. In 1986, Sperry-Mitsubishi sold a file server for $3,000 that ran at 8MHz and came with a 44MB hard drive (you could get a 300MB add-on drive for $3,500). That works out to $375 per MHz.

Moving into Unix territory back then, you could pick up a Tek 6130, which came with two RS-232 connectors, a LAN card, a 40M- or 80-MB hard drive and a 5.25-inch floppy drive for between $10,000 and $15,000. Megadata advertised a Unix box "for under $5,000" that came with a 26MB hard drive and 1MB of RAM.

Printers? Then, as now, laser printers were top of the line. But in 1986, you'd pay $6,000 for an Apple LaserWriter. Microcenter now has several laser printers on sale for $300 and lower.

In 1986, according to FCC records, you could talk for two hours and 22 minutes on an interstate call for $20. By 2005 (the last year for which it has records), that same $20 would keep you yacking for almost a full day (and that's on plain old telephone system — the price would be a lot less for an IP-based service, such as Vonage or Skype).

In 1986, a leased line might cost as much as $1,200 a month for 4800-baud synchronous line. Today, Verizon offers business-class DSL with 7.1Mbps download and 768Kbps upload for $234.95 a month.

AT&T and Visual Communications offered videophones for $75,000 apiece — and they required dedicated 56Kbps leased lines. Today, a QuickCam costs $100 or less.

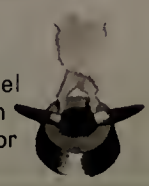
Not everything has come down in price. In 1986, Windows 1.0 cost $99 list (and faced serious competition from QuarterDeck's multitasking DesqView at $65). Today, Windows XP Home Edition starts at about $125 (although one could argue you could replace it with a free operating system, such as Linux).■

Jan. 2000 Y2K arrives with a whimper.

February 2000 Cabletron chopped into four chunks: Riverstone, Enterasys, Global Network Technology Services and Aprisma.

March 2000 3Com spins off its Network Systems business, which includes enterprise LAN switches and remote access gear.

July 2000 Nortel snaps up Alteon Web Systems for $7.8 billion.



Oct. 2000 Five years after divesting Lucent and NCR, AT&T breaks itself up again, this time creating AT&T Business, AT&T Broadband, AT&T Consumer and AT&T Wireless.

2000

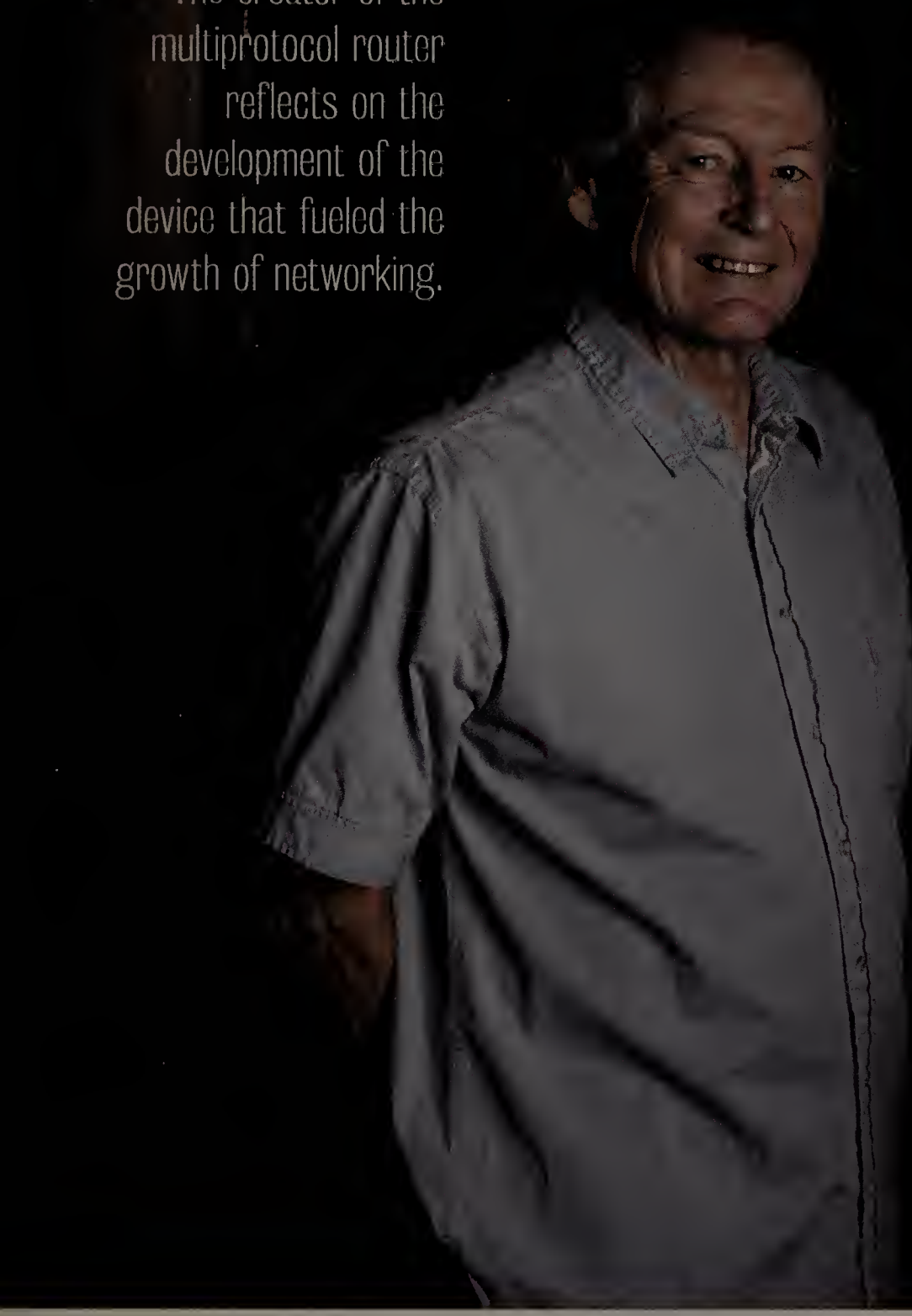
Feb. 2000 Web attackers take down Yahoo, eBay, Amazon, CNN.com and E*Trade with massive distributed denial-of-service attacks.

Feb. 2000 Microsoft ships Windows 2000, which includes directory, security and management improvements.

May 2000 Cisco acquires ArrowPoint Communications for $5.7 billion, a provider of switches used to optimize delivery of Web content.

Router man

The creator of the multiprotocol router reflects on the development of the device that fueled the growth of networking.



WILLIAM (BILL) YEAGER IS 66 AND STILL GETS PEEVED when someone trots out the Silicon Valley fable about how the founders of Cisco invented the router. He was the guy at Stanford University that made it happen. The history of *Network World* roughly parallels the commercialization of routing, so we tracked Yeager down for a glimpse into the scene back then.

You're credited with developing the first router while you were a staff researcher at Stanford. Tell us the tale.

This project started for me in January of 1980, when essentially the boss said, 'You're our networking guy. Go do something to connect the computer science department, medical center and department of electrical engineering.

What kind of gear did you need to connect?

We had mainframes, of course, DEC10 Systems, a number of Xerox PARC Lisp machines, Altos file servers and printers, and over the next year or so added DEC VAXs, Texas Instruments' Explorers and Symbolic systems. All of these things had to be hooked together because we were spread across buildings on campus and people were tired of carrying tapes around.

I thought about this for a bit, and I said, well really what you need is an operating system. So while the cables were being pulled and tested I developed a network operating system [NOS] and routing code [to run on a] DEC PDP11/05. But the Alan Snyder Portable C compiler generated too much code. So I had to go into the compiler and improve the code generators. And that wasn't even good enough. So then I had to write an optimizer for PDP11/05 assembler so I could reduce the code by about 30%. This was major engineering, because you had your hands into everything. It's important to remember the PDP11/05 only had 56KB of user memory, and was diskless.

The struggle was always a balance between how many input buffers you could have. You really had to squeeze things because there was no disk and if you ran out of memory for input buffers you were dead in the water. So you had all of these constraints, which actually had a lot to do with how good it ended up being, because I had to do a lot of work to both assure the memory allocation algorithms would never run out of memory, as well as get things scheduled right. I spent an entire summer making sure the NOS scheduling and packet-switching algorithms were optimal.

PHOTOS BY STEVE SKOLL

1999

January 1999 Lucent acquires Ascend for $20 billion in an effort to round out IP and ATM product offerings.

April 1999 Melissa virus runs rampant on Internet, afflicting millions.

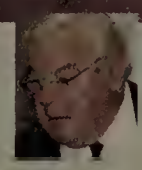
April 1999 AT&T fleshes out bold cable bid with proposal to pay $58 billion for MediaOne, the fourth largest cable TV operator.

June 1999 Former CEO of Bay Networks David House resigns as president of Nortel a year to the day after Nortel's acquisition of Bay.

June 1999 Akamai begins industry's first Internet content-delivery service.

August 1999 MCI WorldCom frame relay network brownout plagues 3,400 of the company's 14,000 frame users.

September 1999 IBM throws in the 'Net towel, sells its switching and routing businesses to archrival Cisco.



Nov. 1999 U.S. Judge Thomas Penfield Jackson rules that Microsoft is a monopoly.

October 1999 WorldCom proposes audacious $115 billion acquisition of Sprint, but the deal is shot down by the U.S. Justice Department on June 27, 2000.

Dec. 1999 AOL surpasses 20 million subscribers.

All in all we had the basic systems put together and working in about three months, and at six months the first router was in place in Pine Hall in a telephone closet. Pine Hall was midway between the medical center and the department of computer science. It was about a 2,000 feet cable run on either side of the router.

What protocols did the box support?

Initially the code routed Parc Universal Packet (PUP) for the Xerox PARC systems and mainframes. Late in '81 my boss said, 'IP is coming down the pipe. Figure out what you can do with it.' So I put a little IP router in, and I didn't have to worry about things like ARP [Address Resolution Protocol] because it was 3 megabit Ethernet so your IP address was just 2 bytes, one for the network and the other for the host, and the host byte was also the [media access control] address. But we were ready by '82 when the computer science department started dropping IP in all of these VAX750s, and by 1983 the routers supported XNS — which is Xerox Network Services — CHAOSnet for the TI Explorer and Symbolics Lisp machines, and IP. And it was just about then that Stanford University started to make the big transition to 10Mbps Ethernet.

Is that roughly when you made the shift from the PDP11/05-based router to the device based on the 68000 board developed by Andy Bechtolsheim (who later went on to found Sun)?

Andy was a master's student, and that collision was fortuitous. We had heard about his board, and we talked to him and he said we could have it. We plugged that sucker into a multibus backplane, plugged in some 3Com Ethernet boards and then rattled off a few copies and I sat down and did a full transition of the code. One of the key aspects of these routers I put together is they really could route. I had a tremendous amount of instrumentation in there. I worked very, very hard to get that right and they could really pass stuff through as fast as the hardware could move. My limitation was the bus speed, that was it. The original Bechtolsheim boards had 256KB of RAM and that was huge at the time. To me it seemed like paradise.

Is that when the school's network started to take off?

People were skeptical at first, but by 1983 it was clear this was the way to go. Initially just technical people were hooking up, but then the rest of the campus got wind of it and it was made official and the thing started growing like hell. I completed the serious development around '85.

What happened in the interim? A lot of tweaking and refinement?

It's endless, right? New features, functions. I did a lot of Lisp work where objects were used, and I adapted that approach in C, so a router was a class, and a specific protocol, say IP, was an instance of that class, and the NOS was multi-tasking. When you added another router, then you ended up putting in an instance as another task or thread. In the network I/O drivers you would look for the link-level type in the packet to determine the protocol, and everything goes into nice queues under these router threads and it all works. That's why Cisco did so well in this, because you could add more and more stuff to the [operating system], no problem. Just add another task.

Speaking of Cisco, when did they enter the picture?

In the spring of 1985 Len Bosack [who was in charge of the computer science department's computer facilities and later went on to co-found Cisco] and another guy knocked on my office door and asked if they could have access to sources for the router code. I said, what do you want to do? They said, we want to improve it, add more features. I said, well that would be great because I have other research tasks to do, and I gave them the password and away they went. I had no idea Cisco had been founded in '84. I'd never heard of it.

So your understanding was they wanted the code for the betterment of the school network?

Right. So we had weekly meetings and they were indeed working on the sources. The decision had been made to go with pure IP routers, so they took out XNS, CHAOSnet and PUP. And ultimately when they got it going about a year later their version of my code became the official Stanford routers. Things were working well and that was my only concern. We had connectivity.

So I guess sometime in '86 I found out about Cisco. We all found out about Cisco and what Len was up to. And yeah, they were developing that code on Stanford time for Cisco. But this was not exactly bad, because other things had happened like that at Stanford before. But Stanford was deciding it was time to put its foot down. 'Guys, you develop something on Stanford's campus, we want to profit from it,' right?

Who was saying this?

This was just kind of the general tenor. So I was called into Stanford Legal and the lawyer told me to bring my sources on paper. Since [Len's partner] was in the Double E department he had the Double E sources. And I sat down, and the lawyer said, 'Will you do a comparison.' And I said, well let's start with the operating system. That's sort of the heart and soul of this. And it was identical except for changing variables names. I said, can you see this? She said, 'I'm a lawyer and I can see this is identical.'

Let's look at other things. Let's look at this network data logblock (a C structure). Well it's been broken into two pieces, big deal. Any time someone gets a chance to go over code again they refine it. It was refined, clearly, but absolutely the same stuff. Derivative. They changed and added a their new routing protocol, no big deal. If you knew networking you could do it. I only did what I had to do because I was driven by my boss and he was driven by the department's needs. And when I stopped I stopped.

Well, then Stanford really put its foot down and Len [and his partners, including Cisco co-founder Sandy Lerner] left the university to focus on Cisco.

Did Cisco ever give you any credit, other than the $100,000 in royalties?

The way royalties work, a third goes to the school, a third goes to the department and a third goes to the inventor. I gave my third back to my department because essentially all of this stuff is born out of a great research environment.

But Cisco has always had trouble giving me credit. They had a Web page that I was very irked by. 'Sandy Lerner and Len Bosack were in love and they had to go out and invent routers so they could talk across campus.' What a joke. And I'm like one of these bulldogs, you know, I get a hold of these guys' pant's leg and I won't let go of it.

I'm sort of a persona non grata down there at Cisco. But it was fun. I was very passionate about this stuff. I'm always passionate about what I do. And I learned a lot about how corporations work and these guys were great capitalists and obviously they turned out with a great company.

So you left Stanford after 20 years and went to Sun, right?

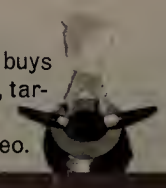
I left Stanford because it was getting more difficult to get grant money, so I did a bunch of consulting at Sun to make some extra money. Mostly dealing with IMAP e-mail stuff because there was a very interesting project at Sun called Spark Station Voyager: a laptop with a fast matrix display, nice little footprint, running Solaris 2.4. Great system. One of the Voyager's special features was that it ran in disconnected mode. You could disconnect it from the network, and it would continued to function. My job was to create an IMAP server and client that worked when the client disconnected. This was tough because, at that time, IMAP2bis did not support disconnected e-mail and I needed to modify the protocol to do this as well as support low bandwidth (IMAP can be very chatty). After one of the guys I was working with quit, his boss asked me to come save the e-mail part of the project. And I thought, I'm 53. I've been at universities too long. So I said sure.

How would you compare the academic to the commercial world?

I always ran into walls at Sun, company politics, and that never worked out too well. When I was at Stanford there was a rule: the best engineering wins. Simple, straight-forward. If your engineering is better than the other guy's, yours got the blue ribbon. Well at Sun, and at companies in general, it's different. It's the politically correct software that gets productized. There are charters and vice presidents and presidents and all of that stuff, and I would find myself embroiled in these battles with people 10 levels above me [laughs], but I just kept battling. I didn't care, because I liked doing good engineering.

So I brought in the IMAP technology and by '96 IMAP servers I had written were everywhere at Sun. And once

See Yeager, page 42



1998

January 1998 AT&T spends $11 billion to acquire Teleport Communications Group, an industry-leading competitive access provider with facilities in 57 U.S. markets.

February 1998 Compaq ends Digital Equipment Corp. era, paying $9.6 billion for the once-dominant minicomputer maker.

April 1998 Catastrophic failure takes all 145 switches in AT&T's frame relay network down for the count.

May 1998 SBC complements the 1997 acquisition of Pacific Telesis with the $56 billion planned acquisition of Ameritech.

June 1998 Nortel buys Bay for $9.1 billion, targets integration of data, voice and video.

June 1998 Microsoft releases Windows 98.

June 1998 AT&T buys CATV giant TCI for $48 billion.

August 1998 Bell Atlantic marries GTE in $53 billion merger.

October 1998 Start-up USinternetworking launches first Applications Service Provider offering.

November 1998 AOL acquires Netscape for $4.2 billion.

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Yeager

continued from page 40

that was in place they decided we should do something called mission-critical mail. So I invented something called Sun Internet Mail Servers [SIMS], which is a whole different type of server. We ended up getting hundreds of thousands of in-boxes on a single server.

The four patents I have, out of the 40 I filed, are on SIMS. The rest are really in peer-to-peer, which I did a lot with as I moved through Sun, ending up as the CTO of JXTA, Sun's open source peer-to-peer project.

What was JXTA all about?

The charter was to create an open source project for the creation of peer-to-peer protocols that would yield a virtual layer on top of the TCP/IP stack. That would return end-to-end connectivity to the Internet by making the traversal of NATs and firewalls transparent, and provide host endpoints with globally unique identifiers. Another goal was to work toward peer-to-peer protocol standards. I personally pushed this forward in the IETF and that resulted in an IRTF Peer-to-Peer Research Group that I still co-chair.

Open source was new territory for Sun and the Project JXTA group were the pioneers. We had a very tight organization and a charter to do disruptive technology, so it was a grand experiment. An engineer was two degrees of separation from the vice president and they were always available for discussions. Amazing! We received an introduction to how to do an open source project from CollabNet and they hosted Project JXTA. Initially, most of the engineering was done by Sun but then the JXTA community began to grow exponentially and great contributions came from non-Sun members.

But then a lot of things happened to the organization. JXTA was put under the product side of things, which kind of gave me the shivers. I mean, you get into product stuff and you're in a box. You can't get out. I always managed, but just because I was irritating enough for my vice presidents that they would say, 'Go do something else.'

So in 1998 I'm talking to my vice president and he says go do what you want. And I said I'm doing wireless. It's the next big thing. He says OK, if you believe it, go do it.

I wrote something called the iPlanet Wireless Server, which sat between IMAP e-mail on the back end and on the other side you could go to [Wireless Application Protocol] servers or any kind of wireless device. It was presentation language stuff so, depending on the device, you put out screens for phones or whatever. It was quite cool. It ended up being probably one of their only money-making wireless projects.

Based on some of the projects I know you've been involved in, a common thread seems to be handheld devices. Do you see particular promise there?

Over the years I've developed a real interest in mobile devices, which was one of my reasons to go to Sun in the first place, to do this mobile laptop, which they ultimately end-of-lifed (in error, but they did it anyway). So I saw the power of these devices and I saw the power of integrating these devices. You could see wireless moving in, see all of this happening. It was very clear.

I felt we ought to do something to get some decent user interfaces on these devices. That's going to be a big next step. I don't think everybody in the world's going to have a computer, and it's stupid to ask everybody to learn to type. If you can use a mobile phone there are ways around this, and that's part of what I'm working on if I can get this new company going.

What's the focus of the new company?

It's called Peerouette, and it's a new twist on peer-to-peer. I've created what's called a deterministic peer-to-peer network. That is, the peers are never down because the peers are not your devices. The peers are in the network and hosted by ISPs. Your device just authenticates strongly with public key and gets in there. And all your content lives in the network and is shareable 24 by 7.

You drop your mobile phone in the toilet, it's done, but it's all backed up. Automatically. My colleague says 'Bill, go to this URL.' I do. An image of his mobile phone appears on my laptop. He says 'press the menu key.' I do. I'm looking at his menu. He says 'take a picture.' I do. A picture of him appears. We've really gotten into these operating systems, how they work. We can totally control mobile phones from other devices. This is great for mobile phone people doing IT. All under very strong encryption.

So it's a lot about that and a lot about giving computing back to the people. I'm very big on the garage rock band having a way to sell their stuff. So in my world, you create your community out there in what we call the Peerouette Network, you take your MP3 files, push them out there, we give you billing, give you advertising, and you can sell them for whatever price you want. We'll take maybe 10%, something like that. What we're really doing is giving the user, the wireless ISP and the content provider a fair share of all the content revenue.

That's kind of what I'm up to, if we can fund it and get it going. We are very close. Cross your fingers. The Internet will surely be a better place if we succeed. ■

William (Bill) Yeager

Where born, year: San Francisco, 1940

Education:
- Bachelor of arts in mathematics, University of California at Berkeley, 1964
- Master of arts in mathematics, California State University at San Jose, 1966

Work history:
1971-1975 — Systems programmer, NASA AMES
1975-1994 — Research staff in Stanford University's Knowledge Systems Laboratory
1994-2004 — Sun
Present — Final stages of completing financing for start-up Peerouette

Interests/hobbies:
- Fluent in French, learning Mandarin
- Tennis
- Collecting wine
- Travel to Europe, Asia

Tidbit few people would know: After high school I attended the United States Merchant Marine Academy in Kings Point, Long Island. I left the academy after 18 months, six of which were spent seeing places like Pago Pago, Samoa, Australia, Tasmania, Japan, China and the Philippines. I found a calculus book published in 1895 in the library of the USS Golden Bear of Pacific Far East Lines. I read it, liked the math, and ended up at UC Berkeley where the mascot is the Golden Bear.

Feb. 1997 Alteon, Foundry and other Gigabit Ethernet players show first wares at NetWorld+Interop.

March 1997 Juniper Networks, Avici Systems and Pluris aim to develop super routers.

June 1997 Dancing baby prances across the Internet.

October 1997 Responding to a British Telecom effort to take over MCI, WorldCom swoops in with a surprise $30 billion offer.

December 1997 Cabletron shells out $430 million for Digital Equipment Corp.'s net business, getting high-end switches, channels in the buyout.

1997

March 1997 3Com agrees to acquire modem maker U.S. Robotics in a $6.6 billion stock swap.

March 1997 Novell uses BrainShare '97 to show off new CEO Eric Schmidt.

June 1997 Bay Networks buys Gigabit Ethernet start-up Rapid City for $150 million.

November 1997 AOL reaches 10 million subscribers.

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A special nod of thanks

Al Gore, Bob Metcalfe, Ray Noorda, where would we be without you?

BY MICHAEL COONEY

OK, Al Gore didn't invent the Internet. But he has been more influential in networking than many people realize.

Gore, Bill Gates, Bob Metcalfe, Ray Noorda, these were folks making waves back in 1986 when *Network World* was launched. Their vision, verve and tenacity helped shape the industry we know today, and for that they deserve some extra recognition.

In terms of the leading personalities of 1986, it would be hard to ignore Sen. Al Gore. In March of that year he sponsored the Supercomputer Network Study Act, a plan to get the nation's resources linked to a national network. The bill wouldn't become law for two years, but it was only the beginning of his efforts.

"Libraries, rural schools, minority institutions and vocational education programs will have access to the same national resources — databases, supercomputers, accelerators — as more affluent and better-known institutions," he said at the time.

This is the legislation he referred to in a 1999 interview with CNN's Wolf Blitzer: "During my service in the U.S. Congress, I took the initiative in creating the Internet."

While that quote was later twisted out of proportion and he received a lot of heat for it, you'd be hard pressed to find a politician that had as much influence over the development of today's Internet as Gore.

For example, in 1991 he led the push for the High Performance Computing and Communications Act. Known as the "Gore Act," it supported the National Research and Education Network initiative that became one of the major vehicles for the spread of the Internet beyond the computer science realm. A variety of other technology legislation bares his mark as well.

Today the "recovering politician" can be found helping to run his cable and satellite venture, Current TV, which encourages anyone with videos to upload them for the Current TV community. It hosts interactive blogs and a variety of other media activities mostly targeted at younger people.

Gore recently appeared in the environmental documentary "An Inconvenient Truth," which was the buzz at the recent Sundance Film Festival.

While everyone knows where Microsoft's Bill Gates is, he, his company and some of the key executives must be included here, because 1986 was a milestone year for the company.

Microsoft started 1986 by loading up the trucks at its Bellevue, Wash., offices for a February move down the street to its campus in Redmond.

Spirits were high as the 11-year-old company was abuzz about its IPO slated for March 13. Once that day had come and gone, Microsoft co-founder and then-CEO Gates was officially one of the world's

Al Gore

January 1996 After three years, HP begins to back away from its 100VG-AnyLAN for 100Mbps Ethernet by announcing support for rival 100Base-T.

April 1996 Cisco acquires StrataCom, a supplier of ATM and frame relay WAN switching equipment.

April 1996 SBC Communications and Pacific Telesis Group announce merger plan.

July 1996 Microsoft unveils Windows NT 4.0, code-named Cairo.

Sept. 1996 Cisco agrees to acquire Granite Systems for its Gigabit Ethernet switching technologies.

Nov. 1996 Microsoft gives developers preview copies of Windows NT Server 5.0 distributed directory, security and management services.

1996

February 1996 Congress issues the Telecommunications Act of 1996, aiming to knock down barriers in local and long-distance services, cable television and other markets.

March 1996 AT&T kills off its public Lotus Notes service, a scant eight months after it went live.

May 1996 ATM under the gun. The technology heralded as an end-to-end solution may not go nearly so far, critics and backers now say.

Aug. 1996 Microsoft releases Internet Explorer 3.0 a week before Netscape releases Navigator 3.0. The browser wars start in earnest.

Aug. 1996 Robert Frankenberg resigns as chairman, president and CEO of Novell. Executive VP of sales Joseph Marengi is named president.

youngest billionaires, with MSFT trading at $21 a share.

A month later, the company released MS-DOS 3.2, but it would still be more than three years before Microsoft would introduce the first version of its Office suite.

A 30-year-old Steve Ballmer, now CEO, was head of the Systems Software group.

Together, the operating system and Office would eventually provide more than 90% of all revenue for the company. For 1986, that yearly revenue stood at $198 million. By contrast, in the first quarter alone of fiscal year 2006, revenue was $9.7 billion.

Greg Lobdell, who was then group program manager for languages before later becoming product manager for the first release of Exchange, remembers the intensity of a company that housed its employees in three buildings on a campus that now has more than 40.

"The company was a lot smaller, but in some ways it was more intense. People were more visible. Decisions were more visible," he says.

The not-yet-high-powered in the executive ranks included Nathan Myrvold, who was the applications guru that eventually became CTO, and marketing wunderkind Jeff Raikes, who now heads Microsoft's Business Division, which oversees the Information Worker Group (Office) and the Business Solutions Group (enterprise applications).

Myrvold left in 2000 to dig for dinosaur bones and eventually founded Intellectual Ventures, a start-up that develops and patents inventions.

If Gates & Co. are perceived by some as the dark side of the industry, Metcalfe and the technology he created — Ethernet — would have to be the sunny side. There have been very few success stories as widespread in the network industry as Ethernet.

Metcalfe and the bright side

In 1986, Metcalfe was at the helm of 3Com, which he co-founded in 1979.

Life was good, but a serious new threat had just emerged: IBM's Token Ring network. Introduced in 1985 and shipping in volume by 1986, IBM Token Ring and Ethernet would fight a battle that would last well through the 1990s. While Token Ring networks were faster, they were usually more expensive than Ethernet. The development of switched Ethernet and lower Ethernet costs eventually signed the death warrant for Token Ring.

IBM's Token Ring was a "monopolistic technology that wasn't interoperable with any standards," and when IBM did decide to push for standardization it was too late. "Ethernet killed it," Metcalfe says.

Metcalfe is now a partner with Polaris Venture Partners and still puts in a long week of work as interim CEO of Ember, an embedded network controller company and part of other firms including Mintera, an optical transport firm.

Noorda: Enter the LAN

In 1986 Novell's Ray Noorda was struggling to lift Novell out of financial trouble and was counting on the third version of NetWare to help. It ultimately did, as NetWare came to dominate the network operating-system market by the early 1990s.

But that wasn't Noorda's largest concern. Microsoft was nipping at Novell's heels and eventually became Noorda's biggest foe. Still, staying true to his belief that networking requires openness, Noorda coined the term "co-opetition" and worked with opponents, including Microsoft, to create an open platform for business LANs. His battle with Microsoft continued full throttle, however, and in the early 1990s he acquired WordPerfect, Borland's QuattroPro spreadsheet and Digital Research's DR-DOS in an attempt to compete with Microsoft on the desktop. Finally, in 1993, Noorda acquired Unix Systems Laboratories, which developed and marketed the Unix System V operating system. That acquisition and its subsequent sale of Unix to SCO are at the crux of SCO's copyright claim against Novell.

Noorda, who is retired, went on to create the venture-capital firm Canopy Group, maintaining ties with Novell, but eventually cut off contact in 1996, when he saw that Novell was not recognizing the value in open source technology, including Linux.

Ironically, today Novell is banking on the Linux and open source Noorda embraced to turn itself around.

Bob Metcalfe

Last but not least

Those are just a few of the major personalities of 1986. There were many others. Here's a snapshot of some of the most visible:

- John Akers was at the helm at IBM in 1986. He was named CEO in early 1985 and added chairman to his title in June 1986. Akers retired from both positions on April 1, 1993, after 33 years with IBM. Today he sits on the boards of PepsiCo, Lehman Brothers Holdings, Hallmark Cards, W.R. Grace & Co., and New York Times Co. When he became chairman in 1986, current CEO Sam Palmisano already had 13 years under his belt at IBM.
- David House was at Intel in 1986 but played a large part in the network industry in the past 20 years. While he was CEO of Bay Networks he negotiated and led that company through its merger with Nortel and served as president of Nortel after the completion of the merger in 1998. He formed Allegro Networks and is still active in the industry, sitting as chairman of the boards of Brocade Communications and Credence. He is also on the board of Azaire Networks, a broadband supplier. He also works with the Computer History Museum in Mountain View, Calif. Still, he finds time to engage in his passions: heliskiing and auto racing.

Senior Editors John Fontana and Jennifer Mears contributed to this report.

1995

July 1995 3Com snaps up router maker Chipcom for $775 million.

July 1995 IBM acquires Lotus for $3.5 billion.

Sept. 1995 *Network World* launches www.nwfusion.com as a way to fuse print and online delivery of news and analysis.

Sept. 1995 Cisco agrees to acquire Grand Junction Networks, the inventor and leading supplier of Fast Ethernet (100Base-T) and Ethernet desktop switching products.

Oct. 1995 Jim Manzi steps down as Lotus CEO 99 days after company is acquired by IBM.

May 1995 Bay Networks snaps up token-ring switch start-up Centillion for $140 million.
May 1995 Sun launches Java.

August 1995 Microsoft releases the oft-delayed successor to Windows 3.1, Windows 95, which includes Internet Explorer 1.0.

Sept. 1995 AT&T carves itself up, forming AT&T, Lucent and NCR. Lucent officially becomes a separate entity Oct. 1, 1996.

Dec. 1995 Compaq, 3Com and Sun pitch 1Gbps Ethernet as backbone alternative.

With new pay, new responsibilities

Net executives' salaries rocket upward as stature grows.

DAN VASCONCELLOS

BY JULIE BORT

It is 1986. Ronald Reagan is in the oval office. It is the year of the space shuttle Challenger disaster, the Chernobyl nuclear meltdown and the launching of Fox television broadcasting. At the office, the fax machine rules. While DOS-driven PCs are everywhere, the important data is coded in COBOL and locked away on mainframes in hallowed glass rooms.

In 1986, the network folks, more commonly known as datacom managers, earned a cool $52,000 on average, according to the IEEE. By comparison, software specialists were making about $49,000. These were good jobs that paid well for the times — equivalent to about $89,000 in today's inflation-adjusted dollars.

But in the next 20 years, good would get a whole lot better. For middle managers who rode the technology explosion to the upper echelons of the game, garnering vice president positions or one of the many C-level titles, salaries and perks reached about $130,000 in 2005, according to a *Network World* salary survey. That's more than a 150% increase.

"In '86 I was at a facilities management firm making about $49,000, which back then was not bad at all," says 52-year-old Zack Lemelle, a 30-year IT veteran who is now CIO at the Ethicon-division of Johnson & Johnson, in Somerville, N. J. "Now I have 98 people reporting to me and I'm earning more than ever. It's never enough, of course, but I'm earning more than I envisioned I would as a young buck."

Today entry-level help desk trainer jobs pay $53,000, while middle IT managers who report to the network executives take home about $82,000, the *Network World* survey shows.

Twenty years after it began, the war between the telecom and datacom sides has been largely won by the data people, at least on the salary front. In 1986, telecom engineers earned $56,000, about 8% more than their datacom counterparts (at $52,000). Today, telecom managers take home $82,000 and often report to the datacom execs.

From back room to boardroom

With the salary hikes came new respect. In 1986 IT workers were highly technical and skilled, but to those in the boardroom mostly invisible — a necessary expense like accountants and security guards.

"Twenty years ago, it was very much an us-vs.-them mentality," says Evan Scott, president of IT executive recruiting firm Evan Scott Group International in Philadelphia. "Data processing and networking were seen as overhead having nothing to do with the business, you just had to have them."

Not only are the IT executives now highly visible to the boardroom, they are often members of it, with roles such as CIO, CTO, CSO. "Today, a CSO, CIO or vice president of engineering is every bit as highly valued [by the business] as a chief marketing officer or vice president of sales," Scott says. "They are in parity with other top executives. And demand for folks that understand security is tremendous."

With that increased visibility has come a complete revamping of IT's role, Lemelle says. Business intimacy, as he dubs it, is the core of the job today. An IT worker is required to intimately understand the employer's industry and how technology serves and enhances the company.

Twenty years ago, such knowledge was irrelevant — technology competency alone determined pay and status. "It was, did you know the IBM mainframe or Univac? Did you know how to run a personal computer?" Lemelle says. "Now it's about what you know about healthcare, education and different kinds of industries. You need to know what the opportunities are and the implications of technology for those industries."

This is true even for entry-level IT software programmers, he adds. "Back in the old days, programming took place in smoke-filled back rooms sitting in front of terminals all day. Kids today spend more time with the client understanding the processes and devising automated solutions to meet those needs."

The business technologist role will evolve to be ever more critical in the years ahead, Lemelle says. Scott agrees: "We are in a golden age, but relative to 20 or 30 years ago, we may be at the beginning of the golden age."

However that golden age progresses, one thing seems certain. Network executives can expect to take it to the bank. ■

January 1994 MCI forms MCI Metro subsidiary and announces it will spend $2 billion to build alternative access networks in 20 cities.

March 1994 Bill Gates and Craig McCaw file plans with the FCC for a massive low-orbit satellite venture called Teledesic Corp.

March 1994 Novell announces plans to acquire WordPerfect for $1.4 billion and Borland International's spreadsheet business for $145 million.

April 1994 Yahoo is founded by two Stanford Ph.D. candidates.

June 1994 After five years of development, the federal government pulls the plug on the Government Open Systems Interconnection Profile (GOSIP) and gives the nod to TCP/IP.

July 1994 LAN hub kingpin SynOptics ($713 million) merges with Wellfleet ($323 million), the second-largest router maker, to form Bay Networks.

August 1994 AOL reaches 1 million subscribers.

September 1994 Mosaic Communications announces Web browser called Netscape and Web server called NetSite at NetWorld+Interop. Two months later adopts Netscape as the company name.

December 1994 Red Hat Software founded.

1994

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20 years in network

Survey asks *Network World* readers to reflect on the past, present, future

BY RYAN FRANCIS

It's hard to remember what life was like 20 years ago. And it's harder still to figure out how we got anything done back then.

"I can't imagine life without the PC, e-mail, my DVR, air conditioning in my car, home and work," says Brett Case, a LAN coordinator at Ross Stores in Pleasanton, Calif. "Did I mention life would be miserable without DVR?"

The benefits of tech tools aside, more than 70% of *Network World* readers surveyed said their standard of living is better today than it was 20 years ago. But it's not all good news. Some 11% said their standard of living hasn't changed, and 10% said they are worse off (8% are too young to remember).

Asked whether they would do it differently if they could do it all again, fewer than half of the respondents said they would pursue the same path in technology. A whopping 37% said they like the tech field but wish they had taken a different path, while 12% said they would eschew tech altogether, and the rest weren't sure.

The survey went on to ask readers to reflect on everything from top industry visionaries to the biggest tech flops.

Not surprisingly, respondents picked Bill Gates as the individual who has made the biggest impact in the last 20 years, though some said he was just in the right place at the right time.

David Green, president of NetGreen Consulting in Bluffton, S.C., sees both sides of the argument. "Bill Gates is the ultimate example of brains and luck meeting under happy circumstances."

Other respondents said Gates was brilliant in how he built Microsoft, especially with the various acquisitions over the years, but they stopped short of calling him a visionary.

"He outbluffed IBM and snookered Apple," said Harold Finz, who is a software architect at CitiGroup in California. "But he's not a visionary. He always let someone else pave the way, take the chances and then he'd either learn from their mistakes or else buy his way into the field."

Thom Count, a network consultant at Genzyme in Cambridge, Mass., gave Gates more credit, saying Gates' predictions have all come to fruition. He said that even when Gates was producing Basic for CPM machines, he could see the bigger picture.

Although not listed in the survey, readers wrote in Cisco CEO John Chambers, Linux creator Linus Torvalds, Apple CEO Steve Jobs and Intel's Bob Noyce and Gordon Moore as other industry visionaries.

More important: PC or Internet?

Asked which technology they couldn't live without — the Internet, PCs, cell phones or PowerPoint — 51% said the Internet was all important. But many readers noted there is something of a chicken-and-egg dilemma when it comes to weighing the Internet against PCs.

"I don't know that the Internet would have become so prevalent without the Web sitting on top of it," says Kai Hintze, senior systems programmer at Albertsons in Boise, Idaho. "And the Web wouldn't have become nearly so widespread without the fairly standard graphics terminals that PCs provide."

True enough, but Wayne Hainsworth, network engineer at Tidland in Camas, Wash., said simply: "Without the Internet, my job would be a bit more difficult; without PCs, I wouldn't have a job."

Readers, in fact, credit the PC with delivering the greatest increase in corporate efficiency. E-mail was a close second.

"The PC is a general technology that provided across-the-board productivity increases," said Matthew Simpson, manager of e-commerce and intranet at MOL. "E-mail is just a more efficient and personalized form of messaging technology that already existed in most industries."

One survey respondent went as far as to call e-mail a drain on productivity, but others ascribed loftier accomplishments to its wide adoption. "Never in the history of man has collaboration on projects been so easy and cost effective," said Jim Norris, director of IT for Cochise County in Arizona. "The face of politics and society has been impacted by [the ability of] common citizens to exchange ideas and information as never before." He said changes favoring democracy in Eastern Europe can be attributed to the Internet and e-mail.

DAN VASCONCELLOS

Shouldn't have worked

It isn't likely anyone will ever credit ring tones with anything that grand. Ring tones topped the list of technologies that respondents thought would flop but somehow came out on top.

"Ring tones? Self-indulgent, annoying, ought-to-be-illegal technology," summed up Simpson. "The thing that frosts my flakes, I can't just pick a 'nor-

February 1993 Paine-Webber signals an industry shift by cashing in its IBM SNA network, front-end processors and cluster controllers for a TCP/IP net based on LANs, routers and frame relay links.

March 1993 Novell rolls out NetWare 4.0, saying it is the most important product in the company's history. The new version adds support for multiple servers and the Novell Directory Service.

May 1993 Microsoft formally announces Windows NT at Comdex/Spring in Atlanta.

1993

February 1993 Marc Andreessen, introduces Mosaic, the first graphical browser, while working at the National Center for Supercomputing Applications.

April 1993 SynOptics, Cisco scrub plans to develop the RubSystem, an integrated hub/router.

king

f the network industry.

mal' ringing sound for my company-issued phone. It's got to be some kind of symphonic nonsense."

Blogging came in a close second. Hintze said he can't see what the fuss is about."I don't see how blogging differs from online articles, other than now there is software to make blogs easier to post."

Other write-in answers added by respondents included text messaging, Skype and social-networking sites.

On the flip side, topping the list of technologies that received the most hype but petered out was ISDN, what Simpson referred to as"I Still Don't Need."

Respondents said ISDN failed because of interoperability problems, lack of widespread deployment and the fact that there were too many standards."It had lots of potential that was never realized," Hintze says."But advertising was just enough to whet your appetite without really telling you how and where to get it, while execution was sporadic."

Next big thing

Asked to ponder what the next big thing 20 years out will be, respondents said wireless broadband."Deliver me from the bounds of the cable and DSL monopolies, please," Simpson pleaded.

"The impact wireless broadband has on technology is enormous and will continue to grow," Hainsworth said."It's a natural extension to today's hardware technology."

Green said wireless broadband will be the biggest technology change since the growth of television."It's also going to present the most challenges regarding reliability, security and business models to support its use."

Other technologies that could leave a mark include nanotechnology, personal area networks and biological computing.

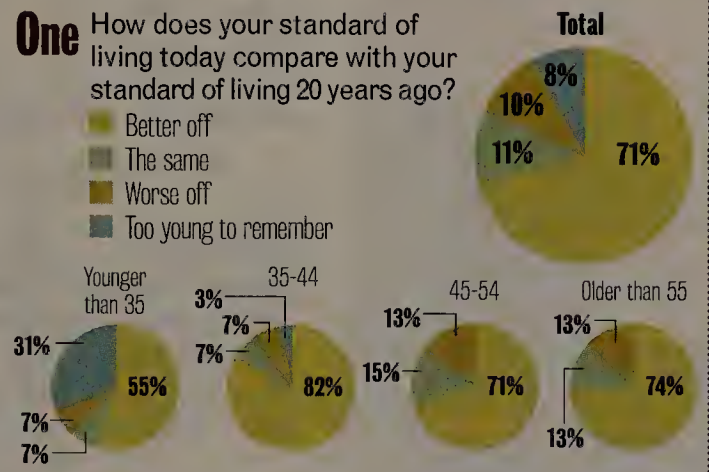
"I really think RFID is going to be used to answer two of life's most persistent and troubling questions: Where are my keys and where is the remote," Finz says.■

Let's play 20 questions

In trying to narrow down all the answers of the network world in the past 20 years, *Network World* instead played only 10 questions with 322 respondents. Eighty-seven percent of the respondents were male, and the majority was between the ages of 35 and 54.

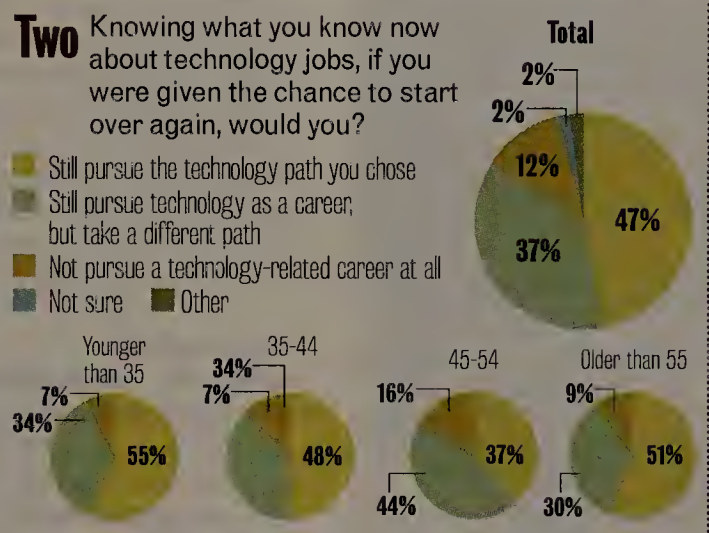
One

How does your standard of living today compare with your standard of living 20 years ago?



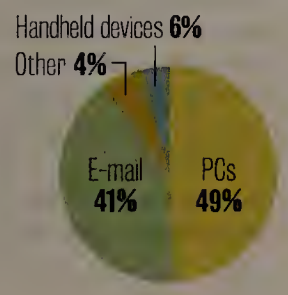
Two

Knowing what you know now about technology jobs, if you were given the chance to start over again, would you?



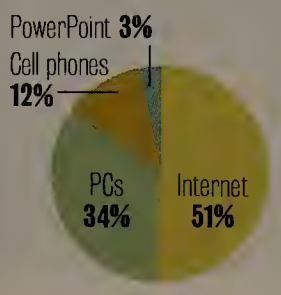
Three

What has created the biggest improvement in your company's efficiency?



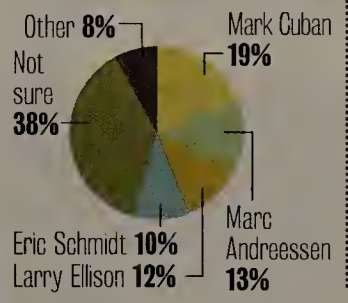
Four

What could you not live without?



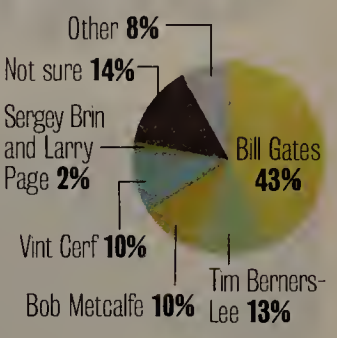
Six

Who is the luckiest person in the industry who just landed in success by happenstance?



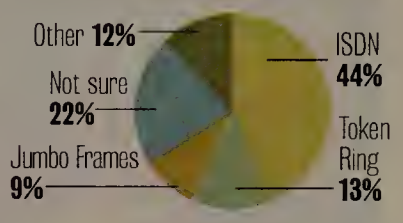
Five

Which tech visionary had the biggest impact over the last 20 years?



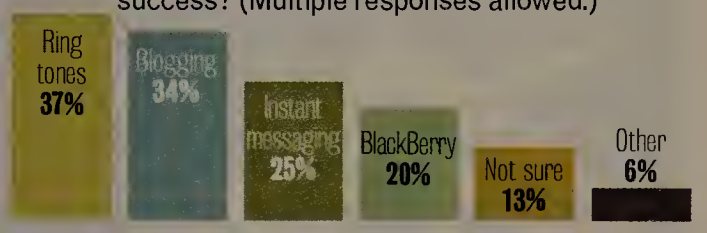
Seven

Which failed technology did you have the highest expectations for?



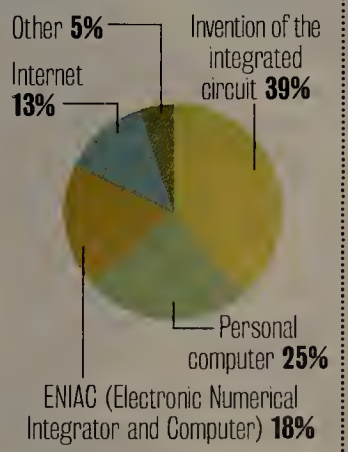
Eight

What products or services did you think were never going to work, but turned out to be a success? (Multiple responses allowed.)



Nine

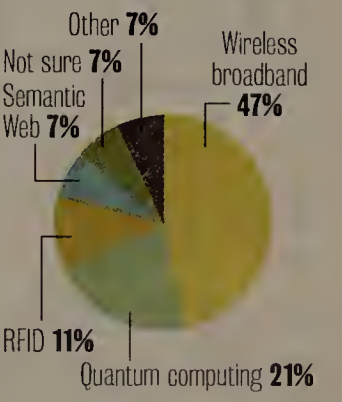
What marked the beginning of the Technology Age?



Write-ins: Vacuum tube, telegraph, invention of fire, Sputnik

Ten

What will be the next big technology over the next 20 years?



Write-ins: Nanotechnology, robotics, biological computing

March 1992 Although some are proclaiming LAN Manager dead, Microsoft pushes on with the announcement of the next generation, LAN Manager for Windows NT.

October 1992 Start-up Grand Junction reveals it is developing a 100Mbps version of Ethernet that will use unshielded twisted-pair cabling.

1992

September 1992 Cisco offers Advanced Peer-to-Peer Internetworking (APPI) as an alternative to IBM's APPN to combine SNA peer-to-peer routing with TCP/IP features. Cisco abandons APPI 11 months later.

Gigaflops

NOAH Z JONES

Our editors and columnists nominate their favorite failures chronicled — OK, hyped — in *Network World* during the past 20 years.

John Gallant
***Network World* editorial director**
ATM: Requiem for a dream

ATM was undoubtedly a flop — a local-area networking dead end for corporations that committed millions of dollars to implement it and for many of the start-ups that were launched at the height of ATM mania in the mid-'90s. (Although some of those newcomers did quite nicely for investors, thank you, including Fore Systems, which Marconi acquired for $4.5 billion just before a much bigger bubble burst, the dot-com one.)

ATM wasn't some run-of-the-mill failure; it represented the death of a grand dream of unified networking across the LAN and WAN. ATM was envisioned as a single network technology that gracefully would support converged applications across enterprise and service provider networks. ATM has had an honorable career in the latter, but it never achieved the hoped-for glory in the LAN, where it was tripped up by its own complexity and technical limitations, and the relentless improvements in Ethernet's price and performance. Like the Open Systems Interconnection model, ATM takes a special place among other honorable efforts to make the network world a better place. For that, a moment of silence, please.

Scott Bradner
Columnist, "Net Insider"
OSI: Count the wasted billions

It's hard to top ATM for being a wrong path followed with vigor, but there is another data network blunder of about the same scale: the Open Systems Interconnection protocol suite.

The OSI protocol suite was developed by the International Organization for Standardization (ISO) after it turned down an offer from the United States in the early 1980s to let ISO use TCP/IP as the basis of the data network standard for the world. More than 10 years and tens of billions of dollars of software development later (IBM and Digital both spent multiple billions on their own), the U.S. government stepped back to take a look at the state of data networking. Like most governments, it had been mandating support for OSI for quite a while, and it was common knowledge, including in this magazine and the IETF, that OSI was the way of the future. Mostly unnoticed by the governments, however, the Internet and TCP/IP kept chugging along.

In early 1994 the U.S. government said formally that it was OK to use TCP/IP when it could do the job. It took a while for other governments and industry to abandon the OSI trail and find their way back to TCP/IP, but eventually they did. OSI is now known mostly for the seven-layer model rather than an expensive and complex data communications protocol.

February 1991 AOL adds support for IBM-compatible PCs.

September 1991 Crescendo unveils the industry's first 100Mbps FDDI over unshielded twisted pair.

1991

October 1991 Linux kernel released.

Johna Till Johnson
Columnist, "Eye on the Carriers"
ISDN: I Still Don't Need

Remember ISDN, the original technology sans business driver? As every sentient telecom manager recalls, ISDN — also known as "I Still Don't Need" — was the telcos' original lame answer to voice and data convergence. With ultra-low speeds and twice as much voice as data capacity, it demonstrated an astounding failure to envision the upcoming explosion in data traffic.

ISDN went on to become a back-up alternative for packet services (chiefly, frame relay) and the infrastructure of choice for some videoconferencing deployments, but its predicted massive deployment was short-circuited by the rise of the Internet.

Full disclosure (at the risk of irreparably sullying my reputation as a pundit): One of my earliest publications was a technical paper in an IEEE conference on ISDN chip design. D'oh!

Then there was switched multimegabit data services: Last year I ran into an enterprise that had finally retired its SMDS network.

I think they may have been the only paying SMDS customer on the planet. On paper, SMDS was an engineer's dream: Telecom designers had thought of every possible contingency and architected a data service that offered rock-solid delivery guarantees and scaled smoothly into multiple megabits per second. Providers including MCI and several of the RBOCs invested millions of dollars to roll it out. There were only two problems: In the mid-1990s, when SMDS was introduced, most enterprises didn't need that much bandwidth, and by the time they did, IP and Ethernet services had taken over. The upshot? No uptake. Oops.

Kevin Tolly
Columnist, "Tolly on Technology"
IBM: A history of flopettes

As I've mulled over the list of technologies that would fit under the headline of flop, it occurred to me that the biggest flop wasn't a technology but a company: IBM.

As successful as it is today, it should have been — should have remained — the dominant computing company in the world. With all due respect to the many who labored to develop its various technologies, as a company IBM was the biggest flop of the last two decades when one considers what it could have accomplished. Look at the list of technologies that went nowhere:

- Microchannel Architecture — the first smart PC bus software that could be configured without flipping hardware switches. It fought against EISA, and ultimately neither survived.
- OS/2 — Announced in 1987 and originally a joint effort with Microsoft, this became a very solid operating system. It was technically far superior to Microsoft's competing products but was outmarketed by Microsoft.
- DisplayWrite — Before there were PCs, there were IBM DisplayWriters — purpose-built word processing computers. IBM ported this software to the PC, to its mid-range S/36 and even to the S/370. Yet this word processing program lost out to WordPerfect and then Microsoft Word.
- Distributed Office Support System — Long before there was Microsoft Exchange or even cc:mail, IBM had an architecture and products that allowed peer-oriented information transfer between office systems. User elements were implemented across multiple platforms and conformed to IBM's Document Content Architecture for content and SNA Distributed Services for the store-and-forward delivery mechanism. It, too, lost its battle.
- High-speed (100Mbps) Token Ring came along so long after Fast Ethernet had taken critical mindshare

and work on Gigabit Ethernet was well underway that it became a classic example of too little, too late.

Mark Gibbs
Columnist, "BackSpin" and "Gearhead"
A threefer: Newton, Bob and ME

My nominations in the category of spectacular product flops are the Apple Newton, Microsoft Bob and Microsoft Windows ME.

First, the Newton: Way ahead of its time, but compared with Apple's current hardware designs, it must — like the camel — have been designed by a committee.

Next, Microsoft Bob: This friendly, brain-damaged user interface confused usability with cute and deserved to be terminated with extreme prejudice. Even Microsoft's Clipit isn't as objectionable, which is saying something.

Finally, Windows ME: Yuck. Given *Network World's* audience, I don't think I need to explain that last one any further.

Now, you might argue that there are other flops I could have offered but these three exemplify just how wrong-headed the computer industry can be. Let us hope these products were the last of their lines.

Frank Dzubek
Columnist, "Industry Commentary"
Security: A flop for the ages

For the last 20 years, more has been written about security in *Network World* than about any other topic, and a never-ending stream of security products continues to flow — yet almost all surveys still indicate that the No. 1 corporate and consumer concern remains security.

No matter what you call it — a fundamental industry flaw or using technology Band-Aids instead of solutions — the situation has not changed in two decades.

When private networks dominated the industry, security was an implicit design issue. In today's public network world, security problems are endemic, and new problems appear almost every week.

No matter what vendors promise, no silver bullet may ever emerge.

Joel Snyder
Columnist, "Bottom Line"
Token Ring: Faster? No, flop

When is four bigger than 10? When IBM tells you it is. Armed with a pile of dubious math and the might of the most important computer company in the world, Token Ring's 4Mbps was pushed as "better, stronger, faster" than Ethernet's 10Mbps for years — and an astonishing number of companies bought into it.

Even when the market moved on, Token Ring's religious zealots kept on buying, shelling out $500 or more for new and improved 16Mbps network interface cards (NIC) and thousands of dollars for MSAUs (the Token Ring equivalent of a hub), while everyone else was paying $50 for 100Mbps Ethernet NICs and $250 for managed switches. Token Ring was never a good idea, but it was proof that if you keep repeating the same thing often enough, loudly enough and with authority, someone will believe you.

Token Ring's "four is more than 10" PR people moved on and almost sold us 25Mbps ATM-to-the-desktop on the "25 is more than 100" theory, a tremendous bargain requiring some of the most expensive equipment and interface cards ever sold — until everyone realized that Ethernet did all that and more for a tiny fraction of the price.

ISDN-to-the-home got the hype and was great technology, except that phone company economists and their 30-year-depreciation models rolled it out five years too late and five times too expensive.

By the time all the ISDN gear was in place, DSL and cable modems were starting to give people a taste of what real broadband was all about, and it was all over but the depreciation.■

1990

January 1990 Network failure leaves AT&T unable to complete about 50% of switched calls.

Feb. 1990 Cisco goes public. Revenue will grow 40% per year for every year through 2000, except for 1998, when it grew only 31%.

April 1990 Lotus, Novell announce plans to merge in stock swap valued at $1.5 billion. They call it off one month later.

May 1990 AT&T unveils data version of its Software Defined Network voice service.

July 1990 Compaq rolls out 80486-based SystemPro 486 server.

September 1990 Microsoft, IBM split on OS/2 and Windows development.

Oct. 1990 US Sprint becomes the first long-haul carrier to offer frame relay.

December 1990 3Com exits the network operating system market because of disappointing sales of 3+Open, which is based on Microsoft's OS/2 LAN Manager.

December 1990 AT&T makes $6.12 billion hostile take-over bid for NCR. Deal finalized in May.

Are you a net know-it-all?

Test your recollection of the people, companies, technologies and events that made headlines in the network industry over the past 20 years.

1. Cisco's first acquisition took place in 1993, when it bought what it called "a privately held networking company providing high-performance workgroup solutions to the desktop." Name that company.
A. Crescendo Communications, B. Grand Junction Networks, C. Kalpana, D. Stratacom

2. What's the name of the Linux operating system's penguin mascot?
A. Linus, B. Opus, C. Tux, D. Ossie

3. The Telecommunications Act of 1996 featured a checklist of items used to measure the openness of a Bell phone company's market. How many items were on that list?
A. 7, B. 10, C. 13, D. 14

4. Which of these companies was not part of the consortium that created the PowerPC RISC microprocessor architecture in the early '90s?
A. Apple, B. IBM, C. HP, D. Motorola

5. In the mid-1990s, Google co-founders Sergey Brin and Larry Page worked together on a search engine that went by what name?
A. BackRub, B. BrinPage, C. Giggle, D. Searchme

Google's Brin and Page

6. Which company sold multiplexer maker Timeplex to Ascom in 1991?
A. IBM, B. Newbridge, C. Siemens, D. Unisys

7. Which industry executive was credited with coming up with the "Intel Inside" slogan?
A. Michael Dell, B. John Doerr, C. Andy Grove, D. David House

8. What was the original name of Gigabit Ethernet switch and router start-up Foundry Networks?
A. Centillion Networks, B. Johnson Enterprises, C. Network Central, D. StarRidge Networks

9. What was the name of Sprint's alliance with Deutsche Telekom and France Telecom?
A. Concert, B. SDF, C. Global One, D. WorldPartners

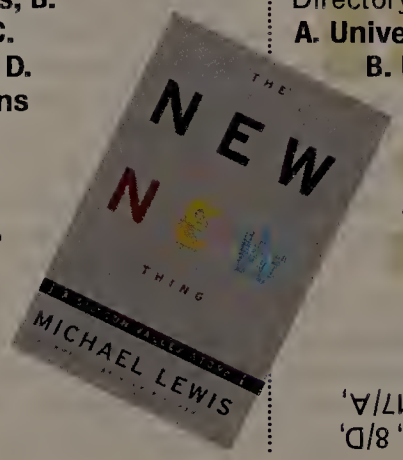
10. Who played Bill Gates in the 1999 TV movie, "Pirates of Silicon Valley"?
A. Matthew Broderick, B. John Cusack, C. Anthony Michael Hall, D. Brendan Fraser

11. What was the name of the company formed by Marc Andreessen after he left Netscape?
A. Egenera, B. Feedster, C. Impervia, D. Loudcloud

Andreessen

12. Which National Football League team played its home games at what was called PSINet Stadium before the ISP went bankrupt?
A. Baltimore Ravens, B. Tennessee Titans, C. Carolina Panthers, D. Washington Redskins

13. Who was the main subject of Michael Lewis' 2001 book, *The New New Thing?*



A. Jim Clark, B. Bill Gates, C. Larry Ellison, D. Eric Schmidt

14. What is Elwood Edwards' claim to fame?
A. The voice behind "You've got mail", B. Creator of the 56Kbps modem, C. First president of the IETF, D. Writer of the Nimbda virus

15. What was the name of the first PC virus discovered in the wild, at the start of 1986?
A. Atom, B. Brain, C. Gallant, D. Rabbit Hole

16. What's the name for the technology once pushed by Alteon and others that extends Ethernet to 9,000 bytes, beyond the usual 1,500 bytes?
A. Huge packages, B. Jumbo Frames, C. Wicked Big Frames, D. Alterno-frames

17. DSL has come in many flavors over the years, with Asynchronous, Rate-Adaptive and Single-Line, among them. What does the V in VDSL stand for?
A. Very high data rate, B. Virtual speed, C. Vectored, D. Vanity

18. Who immediately preceded Michael Powell as FCC chairman?
A. Robert Allen, B. Reed Hundt, C. William Kennard, D. Kevin Martin

19. At which school was the Lightweight Access Directory Protocol created in the early 1990s?
A. University of California at Berkeley, B. University of Michigan, C. Rutgers University, D. Stanford University

20. What year did Novell buy WordPerfect?
A. 1989, B. 1990, C. 1991, D. 1994

ANSWERS: 1/A, 2/C, 3/D, 4/C, 5/A, 6/D, 7/D, 8/D, 9/C, 10/C, 11/D, 12/A, 13/A, 14/A, 15/B, 16/B, 17/A, 18/C, 19/B, 20/D

February 1989 Ark Electronics advertises a 19.2Kbps modem in *Network World* for $3,595, a huge improvement over the dollar per bit cost of modems in the early 1980s.

May 1989 The Corporation for Open Systems (COS) unveils its COS Mark program and announces the first three products certified as OSI-compliant under the plan.

October 1989 NetFrame ushers in the superserver era with introduction of the first 'network mainframes.'

1989

March 1989 Tim Berners-Lee of the European Practice Physics Lab proposes the World Wide Web.

May 1989 AT&T fractional T-1 services hit the market.

October 1989 AOL introduces service for Apple Macintosh and Apple II computers.

November 1989 Compaq enters LAN market with SystemPro server line, which is based on a 33MHz Intel 80386 microprocessor and can accommodate a second 80386.

NETWORKWORLD

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Future shock

Enough with the past. We ask five futurists to describe the changes coming our way.

ILLUSTRATIONS BY RANDY LYHUS

Up close and personal

Superintelligent personal agents will anticipate your needs and change your life.

Daniel Burrus
Founder and CEO, Burrus Research Associates
Book: *Technotrends*

You wake up, turn on the TV and you're greeted by your personal agent, who says, "Good morning, you're flying to Boston this morning, and it's raining so take a raincoat."

As you approach the airport, your agent whispers into your holographic ear bud, telling you exactly where to find a parking space at the airport parking garage.

You go to the gym. Your agent asks what you'd like to watch on television, sets the channel and monitors your workout. Your agent monitors your caloric intake throughout the day via wireless microsensors.

You go to work. Your agent keeps track of your appointments, and provides you with real-time information needed to run your company or your department.

Need to do some research? No typing in search terms on Google and clicking around to find what you're looking for. You ask your agent to find something out and the agent does it — in a nanosecond. You decide what this superintelligent agent looks and sounds like? It could be John Wayne or it could be Wile E. Coyote.

And how likely is this to really happen? "This will happen. This is for sure, guaranteed," says Daniel Burrus.

"There are a lot of forces coming together to drive technological change at a faster rate than we've ever seen before," Burrus says. For example, breakthroughs in quantum computing could blow Moore's Law out of the water. Instead of processing power doubling every 18 months, the growth in computing power could move in an almost vertical path.

That would pave the way for ultraintelligent electronic agents that would use neural networks to learn and eventually get to the point where they anticipate what you want. Because you're mobile and would need to access your agent from a variety of locations, Burrus envisions Web-based services from a company such as Google or Yahoo, or maybe from a company that doesn't even exist yet, providing access to your agent.

Let's say you get an agent. You would start off slowly, giving the agent more and more information about you over time. And you would be able to add plug-ins to the agent. For example, you might get a medical plug-in from your doctor, or a financial plug-in from your broker.

Burrus emphasizes that your agent will be needed in the future to help you deal with the mountains of information that will be available. "We are humans and we will continue to live in a human world," Burrus says, "and these are the tools we use."

The next convergence

Biotechnology, nanotechnology and IT will come together in amazing ways.

James Canton
CEO, Institute for Global Futures
Book: *Technofutures, The Extreme Future*

You're the CEO of a company in the age of Internet 3.

There are 2.5 billion people connected to the Internet, an increase from about 1 billion in 2006. And people aren't just connected — they have pervasive, wireless broadband access.

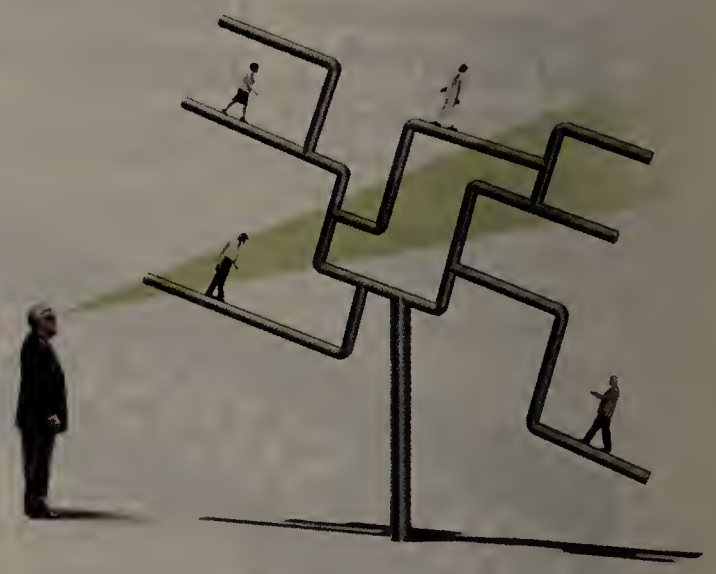
You understand that IT is your ticket to competitive advantage in virtually all areas of business. So you tap into your corporate portal.

"Find me all of my unhappy customers . . . and make them happy."

"Find me the best talent, wherever it is in the world."

"I'm thinking about developing a new product. Find me new customers who would be interested in this product. Oh, and find out how I can produce and distribute it."

"I have an idea for a better way to manage currency fluctuations for transnational clients that I want to monetize. Find me customers who will pay me 1% of whatever I save their company via my new idea, and sign customers up . . . even before I've developed the idea into anything tangible. Once we come to an agreement, I'll embed my service into their networks, and they'll deposit digital dollars into my account."



According to James Canton, this will all be possible because of the rapidly accelerating convergence of IT, nanotechnology and biotechnology. This convergence will create networks that are highly collaborative, deeply personalized, intuitive, predictive, self-healing and self-reflective.

Companies will take advantage of these networks to gain competitive advantage in virtually all areas of business, from supply chain to making employees more productive to customer relations management. "The CIOs of today are CEOs of tomorrow," Canton says. "There will not be a business decision that will not be technology driven."

Canton predicts this nano-bio-IT convergence will lead to embedded devices that will enhance human productivity, such as chips that stream information directly to the

See Future, page 56

February 1988 Tandem wades into LAN market with buyout of Ungermann-Bass for $260 million.

April 1988 AT&T becomes first carrier to offer ISDN Primary Rate Interface service.

May 1988 Fire in Illinois Bell's Hinsdale central office damages most of the 50,000 circuits supported by the switch.

August 1988 MCI celebrates 20th anniversary.

Dec. 1988 IBM sells the development and manufacturing assets of its Rolm Systems Division to Siemens AG. IBM had acquired the PBX maker in 1985.

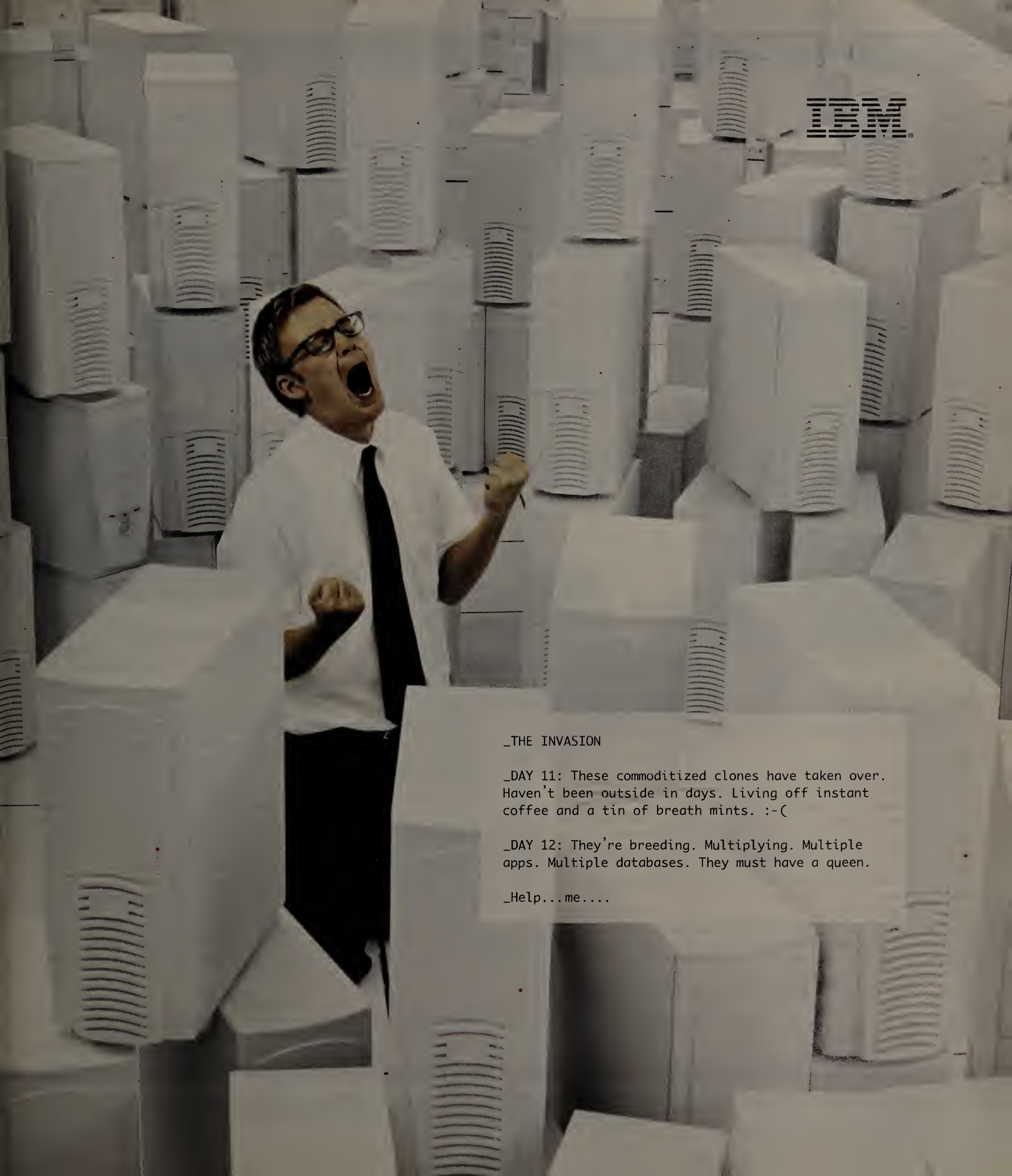
1988

1988 NEC introduces first notebook computer.

April 1988 Illinois Bell files the country's first general tariff for Integrated Services Digital Network.
April 1988 T-1 multiplex maker Network Equipment Technologies storms LAN market with acquisition of Excelan for $125 million.

July 1988 IBM readies 16Mbps Token Ring for fall debut. It is also at work on a 100Mbps FDDI network.

October 1988 3Com ships 3+Open, the first network operating system based on Microsoft's LAN Manager. Digital Equipment Corp. and the X/Open consortium join the ranks of LAN Manager supporters.



_THE INVASION

_DAY 11: These commoditized clones have taken over. Haven't been outside in days. Living off instant coffee and a tin of breath mints. :-(

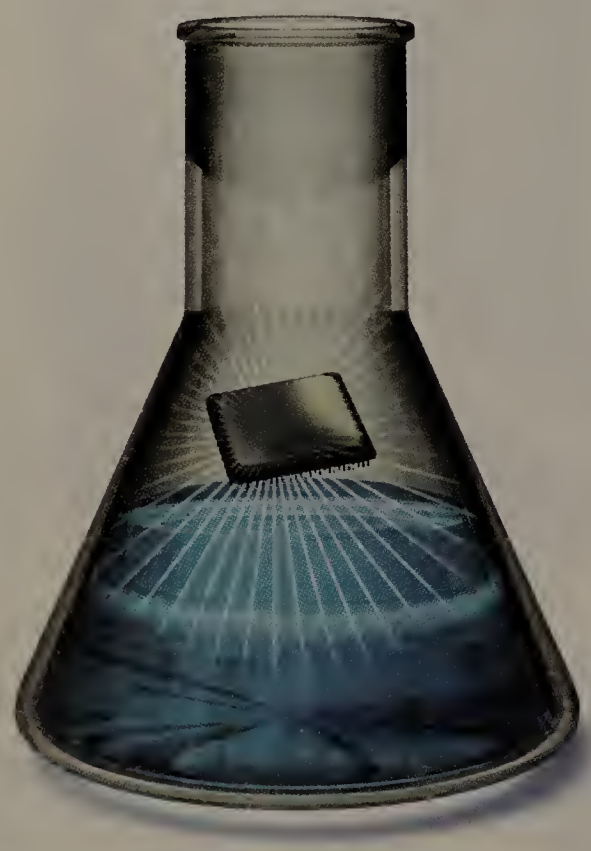
_DAY 12: They're breeding. Multiplying. Multiple apps. Multiple databases. They must have a queen.

_Help...me....

Future
continued from page 54

cerebral cortex, or embedded devices that enhance human intelligence or memory.

And these advances aren't as far off in the future as you might think, Canton says. Nanotechnology — the manipulation of matter at the atomic level — is just starting to take off. Governments around the world have begun investing seriously in nanotechnology, Canton says. "We've started a global wildfire," he says.



Let's get small

Nanotechnology will topple Moore's Law and bring unimaginable changes in IT.

Marc Lurie
President, Foresight Nanotech Institute

Some people are concerned that Moore's Law — the idea that computing power doubles every 18 months — may start to reach the point of diminishing returns over the next five years as current semiconductor manufacturing techniques bump up against the limits of how small transistors can be shrunk.

But nanotechnology will take care of that problem, says Marc Lurie. "A whole new set of technologies will come to the fore. We will see semiconductors and network systems derived from human ribosomes," which are biological components that manufacture protein.

He predicts that within 10 years, advanced nanomaterials will bring about a 1,000-fold improvement in network computing power and performance.

Nanotechnology also will bring huge changes at corporate IT shops, which will be scrambling to find material scientists instead of Java programmers. Data centers will continue to be the large presence they are today, but there will be so much computing capacity that companies will be able to "leverage data in ways that are only barely conceivable today."

Lurie sees advances in nanotechnology occurring in two phases. First, nanotechnology will be used to make things that already exist into smaller forms, such as shrinking circuits on chips.

The second phase will be breakthroughs that can barely be conceived of today, such as using biological mechanisms to make artificial mechanisms. An example is an antenna the width of a human hair built right into the fabric of clothes.

"There will be all sorts of opportunities in non-intrusive ways to integrate people with information," Lurie says.

The digital home

Get ready for on-demand gaming, IP TV and do-it-yourself everything.

David Smith
Vice president, consulting, alliances and education, Technology Futures

The expansion of electronic gaming and MP3-based services will transform the digital home. Look for do-it-yourself, individual content creation on peer-to-peer networks. These networks will ride on the back of expanding computing power, storage expansion, broadband penetration and Reed's law of community building, which says usefulness of large networks, particularly social networks, can scale exponentially with the size of the network.

The power of the games will expand beyond PCs and game consoles to many other forms and devices. On-demand gaming will become part of many households. IP TV will take off because of broadband penetration and new business models.

The virtual enterprise

With broadband video, everybody stays connected and works from anywhere.

Sid Ahuja
Vice President, Software Media Research, AT&T Labs

You're an IT executive for a large company. Employees are scattered all over the world and moving all the time. Still, they are always connected to the network and all of the information they need to do their jobs is at their fingertips.

The network doesn't just accommodate e-mails and business documents. Real-time video is the preferred method of communication. That means the network must be able to handle streaming video between all types of devices.

The network also needs to provide encryption, single sign-on, VPN tunneling, wireless access anywhere in the world, biometrics, identity management and personalization.

Most of this will be outsourced to mobile virtual network operators, who will provide this service to companies, Sid Ahuja predicts. IT executives will still have control over internal networks, databases of key corporate information, but they won't need to own the routers and switches.■

1987
AppleTalk introduced.

April 1987 IBM unveils the PS/2 family of PCs, including models based on Intel's 8086, 80286 and 80386 microprocessors.

July 1987 Early users of Very Small Aperture Terminal (VSAT) satellite networks give the systems high marks.

November 1987 Unisys acquires mux maker Timeplex for $350 million. Sells it for $207 million in June 1993 to Swiss giant Ascom Holdings.

1987

April 1987 Microsoft and IBM introduce OS/2; Microsoft announces LAN Manager, a network operating system that will compete with Novell's NetWare.

June 1987 3Com throws weight behind Microsoft LAN Manager effort.

August 1987 Bridge, 3Com merge.

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Advice for the next generation of IT execs

How should today's IT students prepare for the next 20 years?

BY LINDA LEUNG

IT students today are entering a different world from the one graduates 20 years ago saw. Students of all disciplines are getting at least some IT education these days, meaning that computing is less often regarded as a black art — and that people with a business education are now competing for IT jobs.

"If I want to start a business, I can do it in about 15 minutes, over the Web," says Marc Cangemi, a 21-year-old MIS major at Villanova University in Pennsylvania. "I feel that I am more prepared than students from 20 years ago because our world is so much smaller today. We are no longer restricted to bricks-and-mortar jobs; we are wireless. We are constantly connected, which is a little scary, but I feel that it allows us to make more thorough and well-informed decisions."

Awareness of the business side of IT — and the IT side of business — is going to be crucial for anyone starting out in today's workforce. A report issued by Gartner last September predicts that by 2010, six out of 10 people affiliated with IT will assume business-facing roles. Gartner says "technical aptitude alone will no longer be enough" as IT execs will need to "possess expertise in multiple domains." CIOs want IT pros with breadth and depth of skills and diverse experiences, rather than deep and narrow specialization, Gartner says.

Many IT execs agree with Gartner's predictions and are urging IT students to gain as much business knowledge as they can. Here's advice from six execs for students as they prepare for the next 20 years in IT:

"Today's students should focus more on general business skills than on specific technology skills. Businesses will want IT professionals [who] understand how IT really relates to the basics of what businesses do. This is why more and more, companies are looking for those who have skill sets related to things such as Six Sigma, process analysis and design, and general business knowledge, in addition to some set of technical skills."
Jeffrey van Brunt, *assistant vice president of finance and IT, Salt Lake Theological Seminary, Utah*

"For those who want to be tech guys, their career path is pretty limited to what they can do. If you have an MIS degree, you should start somewhere in programming or systems analysis. The goal is to leverage technology to get into a functional position ASAP — that means understand the supply chain, apply technology to business, look at the bigger picture. You should do this by the second or third year. In the old days, this would take four, five or six years. . . . You should be able to work in a team, but at some point you need to have individual accountability, where independent thinking [rather than] group consensus becomes important."
James Del Monte, *president, JDA Professional Services, Houston*

"More and more, IT professionals are assuming integrator roles. Whether it's bringing together diverse resources within the organization or sourcing services externally, the future bodes well for those who can moderate, manage and design processes to completion. Those who focus purely on technical skills will always have a role either internally as the subject matter expert or in the marketplace as a provider, but competition will increase as demand narrows."
Sean Farney, *global network architect, The Boston Consulting Group*

"In addition to MBAs, candidates for the higher-paying jobs will need to incorporate an international mind-set and capability into their résumé. Being multilingual and having international experience will be pluses."
John Wolfe, *lead information security engineer at a service provider company*

GIACOMO MARCHESI

Some execs believe there are plenty of areas where IT newcomers can enter the profession, but all roads eventually lead to gaining business knowledge and leveraging IT to help the business.

"One of the best areas to get into in IT is second-level PC support [as opposed to the first-level help desk], where you are exposed to an extremely wide variety of software, hardware and problems. It may not be an extremely well-defined category [like security], but it is the area where one tends to learn the most. It is also this lack of specialization that most rapidly teaches someone how a wide variety of technology works, and begins to prepare them for more advanced [specialized] learning, if they are so inclined. Specialization may bring you high salaries for a while, but if you want to isolate yourself from negative trends in the industry [the software of the day, outsourcing] younger people should consider not specializing too early in their career."
Jeff Kohut, *lead LAN analyst at a financial services company*

"As far as specializations go, a good background is a first step, but I would say the No. 1 specialty will be security. I am not talking about people who know how to configure a VPN and firewalls, but someone who can recommend and write corporate access policies and is willing to work with management and the legal department to document violations, including forensic research, and to keep the security policies up to date and enforceable. Good writing and speaking skills are essential for any IT professional, but in the security profession, political savvy and partnerships with legal and management are essential as well."
Mike Taney, *systems engineer, Sovran, Eagan, Minn.*

1986

January 1986 *Network World* prototype issue. Lead story: AT&T axes Net 1000. Pulls the plug on a grandiose service that was to link any terminal to any type of computer.

May 1986 Wang acquires PBX maker Intecom for $156 million.

July 1986 Start-up StrataCom launches the first T-1 multiplexer based on packet-switching.

1986 MCI Mail and CompuServe link their e-mail networks.

1986 Ethernet interface cards for VAXs cost $3,200.

1986 Compaq introduces industry's first 80386 PC.

1986 IBM Netview introduced.

August 1986 IEEE approves an 802.3 proposal for a 1Mbps version of Ethernet similar to that used in AT&T's Starlan product.

1986 McDonald's is first to trial ISDN.

E-MAIL NEWSLETTER SHOWCASE: Convergence

Writer attempts to watch NCAA on computer

BY STEVE TAYLOR
AND LARRY HETTICK

March Madness is creating a unique opportunity for showcasing new technology and what might (or might not) be around the corner. In a move that is in parallel to IP TV, CBS is offering a version that we have to call TVoIP (television over IP).

Dubbed "March Madness on Demand," this series of events is of special interest to us. Steve has one window open to Word, and another playing his choice of up to four live first-round NCAA basketball games. This reflects a need for at least two communities — people who have real jobs and can't watch basketball in the middle of the afternoon, and people who happen to be in a part of the country where, when there are multiple games in progress, the local TV affiliate has chosen to show a game other than the one that features their favorite team.

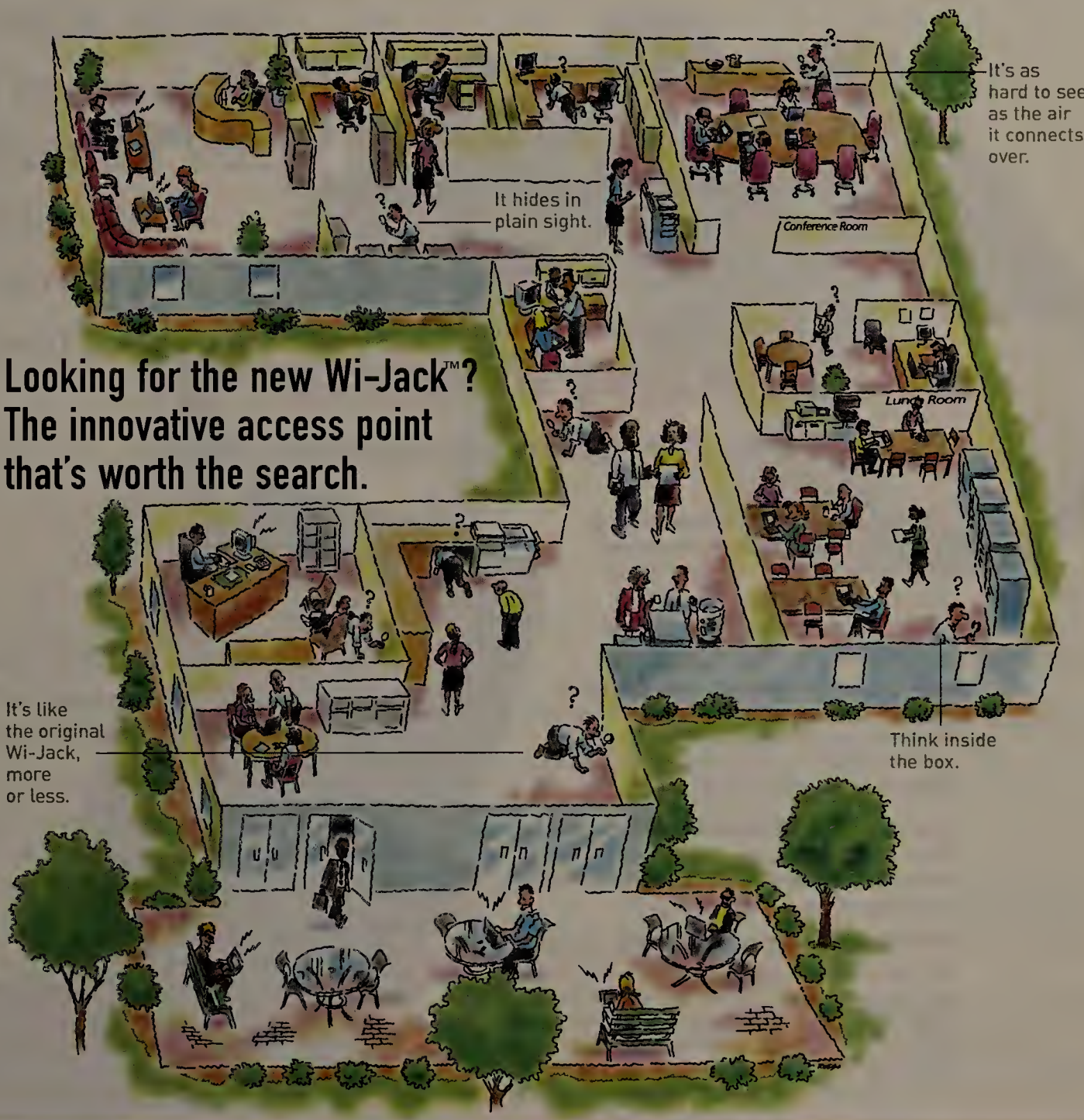
This review of the IP-cast showcases some of the great aspects, as well as some of the limitations, of where we might be going with converging TV with computing, as well as converging work with entertainment.

After registering, one is placed in a queue to get into line to watch the game(s). Depending on the time of day, the queue can be quite long. On Steve's initial attempt to check out the action, he was placed in a "general admission" queue of more than 115,000 users in line — according to the video window. But, as lunch hour ended and as people tired of waiting, the queue diminished quickly, and the wait was "only" about 30 minutes. Later in the afternoon, the queue was at times as short as a few hundred, and access was granted in less than five minutes. Once admitted, though, one could watch and listen for as long as desired. Obviously, this was a good move on the part of CBS in terms of controlling server load.

Once connected, any judgment call concerning video quality would depend on what you're comparing it with. For those who remember when all teams had some shade of gray as their team color, the quality is quite good. But it is not as good as HDTV, or even normal broadcast TV. However, compared with not being able to see your favorite team play, it's pretty darn good, and there's a full-screen option.

The experiment was a success and a harbinger of things to come.

Taylor is president of Distributed Networking Associates and publisher/editor-in-chief of Webtorials. He can be reached at taylor@webtorials.com. Hettick is vice president for telecom services and infrastructure at Current Analysis. He can be reached at lhettick@currentanalysis.com.



The original Wi-Jack™ set the standard as the stylish, high-performance wireless access point that blends smoothly into any office décor. The new Wi-Jack raises the bar by disappearing into the décor. While it's hard to find, it easily integrates into the structured cabling system. The new Wi-Jack will be unveiled at Interop Las Vegas. In the meantime, visit www.ortronics.com/newwi-jack for more information.

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E-MAIL NEWSLETTER SHOWCASE: Branch office best practices

When it's time to use consolidated devices

BY ROBIN GAREISS

The options are broadening for all-in-one devices for the branch office. The question is whose tools to use and when?

This week, Nortel will make its secure router product line available (based on technology from the Tasman acquisition).

Last month, NetDevices started selling its services gateway for small branch offices, and Juniper announced its unified threat management devices.

Vendors are rightfully focusing on creating, enhancing, and sizing consolidated devices for branch offices. We see many IT execs shifting their focus from the data center to the branch office. Their data center consolidation projects are well underway or winding down, and now they need to focus on how to deliver predictable application and network performance to branch office employees.

When does it make sense to use consolidated devices? For any new location, it's a no-brainer.

Like newer technologies such as VoIP, the business case is compelling. Rather than installing a separate firewall, router, switch, network optimization device and VPN, companies can save on hardware, and the operational costs for installation and ongoing management.

NetDevice's SG-4, for example, performs firewall, intrusion-detection/intrusion prevention systems, VPN, switching and routing functions for a price of about $8,000. When totaled as point products, capital costs could be $10,000 or more. Separately, each point product would take about four to six hours to install — that's two to three times longer than to install a consolidated device. It doesn't take long to see the value.

Prices for Nortel's Secure Router product line vary; the line (four products) targets small, midsize, and large locations. The prices for the three smallest products fall below $8,000, but they're priced to be more attractive than buying appropriately sized point products for the size of the branch office.

Where the decision isn't as clear is with existing branch offices. I will discuss the cost issues and benefits of consolidated devices in next week's column. Until then, let me know if you've run into challenges determining the value of consolidated devices, whether implementing them in a greenfield location or an existing site.

Gareiss is executive vice president and senior founding partner for Nemertes Research. She can be reached at robin@nemertes.com.

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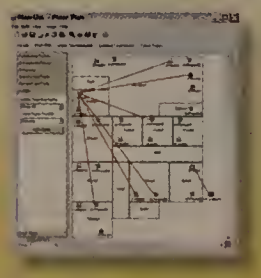

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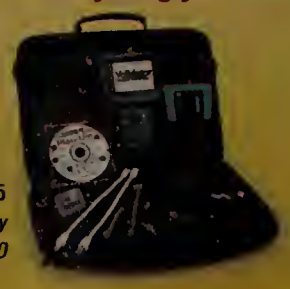

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E-MAIL NEWSLETTER SHOWCASE: IT education and training

Who pays for your continuing education?

BY LINDA LEUNG

Does your employer help identify the technical training that you need for your career and do your bosses pay for your courses and certifications? If your answers are yes, you may be in the minority.

According to a survey published earlier this year by CompTIA, 85% of the 462 IT pros polled said they decide what IT training and education they need based on their own career plans. Just 8% said their employers had requirements or made recommendations for IT training.

As for who pays for education, 88% of the respondents said they paid in full or in part for their training, while 20.5% of tech workers said their bosses provide paid time away from work for training and education.

The workers surveyed said they spent on average $2,200 on training and education in 2005, and expect to increase that amount to $2,300 this year.

The survey also found that 60% of the respondents are looking for new jobs. Although the survey does not indicate whether the job seekers are looking for new positions because of the lack of training support from their employers, Neill Hopkins, vice president of skills development at CompTIA, reports that employees working at companies actively participating in their IT workers' career development are more likely to stay put.

Hopkins said the survey results show that more education of employers is required to help them understand the IT training options that are open to their employees and the training that's required for the different roles.

He pointed to CompTIA's Tech Career Compass, a tool that helps employers and IT pros map work functions to jobs, develop job descriptions, and identify training needs.

Hopkins said while he was a little surprised by the results of the survey, he was shocked at the high percentage — 85% — of respondents who said they receive little career training and education guidance from their employers. He also believes that while many companies provide financial assistance to employers who embark on degree courses, they don't usually provide the same level of assistance to IT workers for IT certification, citing lack of understanding about the importance of IT training by employers as the problem. ■

Pay up

According to a CompTIA,

88%

of the 462 IT pros polled said they paid full or in part for their IT training.

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"Observer is like having an employee on site at all hours to manage the network, we've been very satisfied with its capabilities."

Portia Ulinski, CIO, AAA

Observer's Top Talkers feature shows the current activity for every device on the network in real time.

"We consistently use Top Talkers to track the total amount of stats for each office to see if there is any unusual activity," said Coleman Jennings, senior network engineer. "It's a big problem when a device other than servers, routers or anyone in the IT department ranks high on Top Talkers."

There could be a number of reasons someone tops the list. In one case, Jennings identified an end user transferring a large number of files to a server. He investigated further and discovered that an employee was backing an entire hard drive to that server.

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On another day, an application responsible for providing Emergency Road Service stalled. Without that application, services get delayed, which can leave customers stranded at the roadside for an extended period waiting for help. Jennings drilled down with Observer's Connection Dynamics for a packet-by-packet display of the application's communication with each client.

"The time analysis clearly showed there was a problem with the application, which I was able to immediately address–restoring full service to our customers," Jennings said.

Observer monitors network communication around the clock to ensure that AAA East Central constantly receives the information resources needed.

"Observer is like having an employee on site at all hours to manage the network," Ulinski said. "We've been very satisfied with its capabilities. So far Observer has prevented us from experiencing any downtime."

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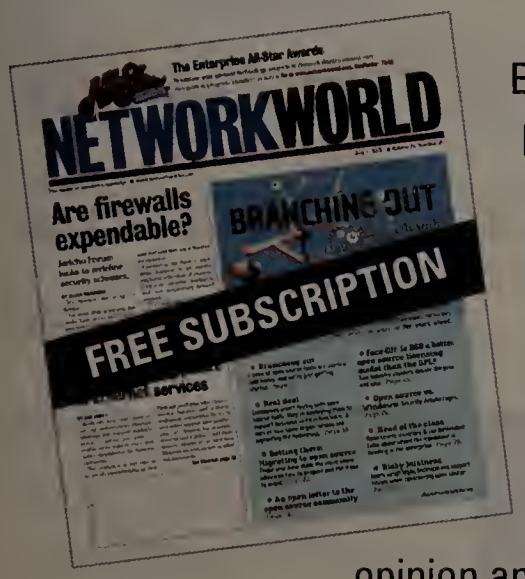

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Editorial Index

A
Alcatel 8
Allegro Networks 45
AMD 21
Apple 48, 53, 66
Applitek 38
AT&T 14, 32, 34, 38
Azaire Networks 45

B
BellSouth 14
Brocade Communications 45

C
Callidus Software 8
Cascade Communications 31
Check Point 18, 32, 33
Cisco 31, 34, 39, 40, 48, 52
CollabNet 42
Compaq 36
Credence 45
Crescendo Communications 52
Cyveillance 10, 19

D
Dell 38
Digital Equipment Corp. 36, 38

E
EMC 10
Equant 25

F
Force10 19
Foundry Networks 52

G
Google 25, 32, 34

H
HP 21, 52

I
IBM 32, 36, 38, 45, 46, 48, 52
Internet Security Systems 8

J
Juniper Networks 34, 60

K
Kalpana 33

L
Lotus 33
Lucent 8, 33

M
Megadata 38
Microsoft 8,12, 33, 34, 36, 44, 45
Motorola 34, 52

N
Napster 34
NetDevice 60
Netscape 33, 36
NetWare 10, 45
Network General 33
Newbridge 52
Nortel 45, 60
Novell 10, 31, 33, 45

O
Opsware 32
Orbital Data 18

P
Peerouette 42

Q
QuarterDeck 38

R
Racal-Vedic 38
RSA Security 32

S
Samsung 66
SBC 32
SendMail 34
Siemens 52
Skype 34, 38
SMC Networks 19
Software Tool & Die 33
Sourcefire 18
Sprint 52, 66
Sprint Nextel 25
SRS Technologies 23
Stratus 21
Sun 8, 40, 42
Sycamore Networks 31
Synoptics 33
Systems Software Group 45

U
Unisys 52

V
Verizon 14, 66
Visual Communications 38
Vonage 38

W
Workshare 23

X
Xerox 39

Advertiser Index

Advertiser	Page #	URL
3COM Corp	26	www.3com.com/switchnow
Adtran	67	www.adtran.com/ipt
American Power Conversion	62	www.apc.com
American Power Conversion	64	www.datacenteruniversity.com/courses
Avocent	20	www.avocent.com/securitytoday
Communication Devices Inc	63	www.outofbandmanagement.com
Computer Associates	4	ca.com/deliver
ComputerWorld	19	www.snwusa.com/nww
Diskeeper Corp	37	www.diskeeper.com/nwmax
D-Link Systems Inc	15	www.dlink.com/at-work
Fluke Networks	29	www.flukenetworks.com/wireless
*Hewlett Packard	35	hp.com/go/ML150mag7
*Hewlett Packard	35	www.hp.com/network/promos4
Hewlett Packard	43	hp.com/go/bladesmag49
IBM Corp	55, 57	ibm.com/takebackcontrol/i5
IBM Corp	68	ibm.com/systems/innovate21
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Network Instruments LLC	63	www.networkinstrument.com/analyze
Network Instruments LLC	64	www.networkTAPs.com/visibility
Nortel Networks	16, 17	nortel.com/securerouter
Novell Inc	22	www.novell.com/free
N-TRON	61	www.n-tron.com
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Ortronics	59	www.ortronics.com
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BACKSPIN Mark Gibbs

Laws in France kick Apple's pants

I don't think Steve Jobs said "Non!," but it captures the essence of Apple's position on a digital rights management bill making its way through the French law-making process.

The lower house of the French parliament, the National Assembly, passed a bill last week that will require all proprietary DRM formats used on content sold in France to be cross-licensable between format owners. This will supposedly allow any vendor to translate any other vendor's protected content into its own DRM format.

The intention of the bill is to ensure that content purchased from any online music service can be legally transferred and played on any digital music player.

The legislation is sponsored by Christian Vanneste, a controversial right-wing French politician (controversial as in publicly making homophobic remarks and bemoaning the end of French colonialism). According to Reuters, Vanneste claims "the draft law aimed to fight piracy, encourage the development of the online digital music market in France and benefit legal online music retailers."

Given that Apple's iTunes owns about 70% of the downloaded music market and has never licensed its FairPlay DRM to anyone, it isn't surprising the company is not too happy about this nascent legislation. Reuters quoted Natalie Kerris, an Apple spokeswoman, as characterizing the proposed law as state-sponsored piracy.

Apple's position is that should this law pass, "legal music sales will plummet just when legitimate alternatives to piracy are winning over customers." Here's what Apple really means: Our music sales will plummet because, even though our music is way too expensive, customers find iTunes easy to use and don't know how to get around our DRM so they overlook the cost. But we know that should anyone else be able to use our format, we'll be screwed.

The question is, if the bill is ratified by the French upper house, the Senate, what will Apple do? Shut down its French operations? Non! Open its DRM format? Merde!

What Apple should do is the latter, as the argument for DRM as a market control strategy is flawed. For a start, the goal of a DRM policy is not the management of publishers' rights, it's the restriction of consumers' rights.

But the biggest flaw is that DRM can't be implemented successfully. You want to break Apple's AAC format, which uses DRM? Easy — burn the tracks you want to a CD and then rip the CD to another format. Sure, this hack is as elegant as me dancing the tango, but it gets the job done.

And as we saw with the Sony BMG fiasco, enforcing DRM is incredibly complicated and difficult to do without something going horribly wrong.

(Allow me to digress for a moment and note that I haven't written about the Sony rootkit debacle for some time, and isn't it disappointing to see that the only punishment the company has suffered is financial? As I wrote at the time, had some teenager done anything similar, he would have been raided by the police, had his computer confiscated and been thrown in jail. The Sony BMG executives remain unscathed. So much for justice.)

The truth is, the only thing that makes DRM work is sloth or ignorance because, if the cost of defeating DRM in terms of money or knowledge is higher than the cost of the content, then DRM will win. If it isn't, DRM loses.

What Apple fails to realize is that the French legislation merely hastens the inevitable: At some point the shine will fade off the iTunes/iPod world and consumers will get what they want — low-cost content and content portability. If Apple is smart (and given its history of getting its own way, it probably won't be), it will get there first and never run the risk of losing market share.

Open your format to backspin@gibbs.com or on Gibbsblog, we don't care which.

NETBUZZ News, insights and oddities

Paul McNamara

Sprint's ambassadors of ill will

This week we have marketing, blogging, marketing through blogging, and questions about journalistic ethics all wrapped up in a messy little package. And at the end I get caught taking a freebie from Verizon.

Sprint recently launched what that carrier calls its Ambassador Program, which sounds like a frequent flier deal but is actually a marketing ploy whereby influential bloggers are given a Samsung A-920 cell phone and six months' worth of free yap on the Sprint Power Vision Network. They get to keep the phone.

The idea is that these bloggers will sing the praises of the phone and the Sprint service in their blogs, thus buying Sprint the kind of grass-roots buzz that marketing budgets simply cannot provide.

In this case, however, the idea has not gone entirely as hoped. Witness a series of posts from one of the ambassadors, Christopher Carfi, on his blog called The Social Customer Manifesto (www.nwdocfinder.com/2740). Seems as though Carfi has had such a hassle trying to get his phone service in working order that the device has already been relegated to paperweight status.

"Guess I mothball the phone for six months," Carfi concludes.

Sprint isn't the first to try this seed-the-bloggers strategy, but the tactic is gaining momentum as the influence of blogging escalates.

I'll do my best to hide the hurt, but Sprint didn't ask me to be an ambassador. Perhaps that's because my blog is so new. Or maybe the company's marketing people are savvy enough to realize that professional journalist-bloggers operate under ethical constraints that generally preclude accepting freebies of any significant value. (Or maybe it's the fact that my blog is, ahem, relatively undiscovered at this point.) Whatever the reason, it was never going to be.

But reading the posts written by Carfi and others did get me to mulling (www.nwdocfinder.com/2741): Might it be time to rethink those ethical restrictions that would have forced me to decline the invitation that Sprint never offered?

I mean, Carfi demonstrated quite emphatically that a credible voice cannot be bought for six months' worth of free calling and a phone.

Shouldn't professional journalists be afforded the same benefit of the doubt by their bosses and readers?

The mere suggestion will be considered heresy by many journalists — and they'll have a good case to make. After all, credibility is everything in this business, and we have enough challenges maintaining it without adding another. As things stand, too many readers presume we're in an advertiser's pocket any time we write something nice about vendors or fail to slap them around.

Bottom line: Freebies just aren't worth the risk for someone who does this for a living.

So what ever possessed me to take one from Verizon mere hours after writing those words on Buzzblog?

Would you believe because everyone else getting off the Massachusetts Turnpike at my exit was doing the same thing? (I know that excuse never worked with Mom, but . . .)

"Tolls paid today by Verizon Yellow Pages," read the flashing neon sign situated 50 yards or so from the booth. And it soon became clear that yellow-clad Verizon employees were standing alongside exiting traffic waving at drivers whose tabs their employer had so graciously made disappear. From afar I could see that one of those waving was an African-American fellow, kind of rotund, and the thought flashed through my mind: "No, it can't be. I mean the movie career isn't what it used to be, and he does make all those commercials . . . but it can't be." It wasn't.

Still, the gimmick was a good one, as marketing gimmicks go. For the price of a 50-cent toll Verizon got a bunch of grumpy commuters to smile . . . not to mention a plug in *Network World*.

Direct your comments and James Earl Jones spottings to buzz@nww.com.

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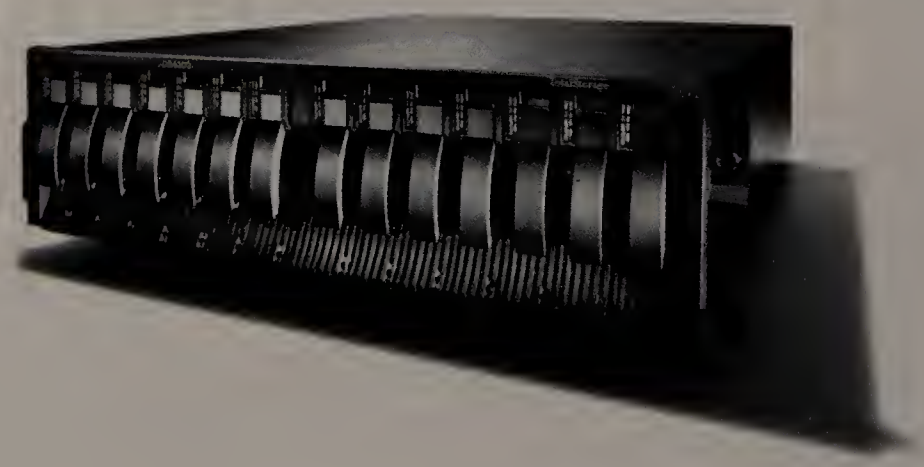

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